↓ 5mm トを、A5横原稿の上エッジに合わせる。仕上りB6横

ADVANCED AND EVER ADVANCING MITSUBISHI ELECTRIC

MITSUBISHI

PROGRAMMABLE CONTROLLERS

MELSEC-F

USER'S MANUAL

FX2N-64DNET DeviceNet Interface Block

FX2N

Foreword

- This manual contains text, diagrams and explanations which will guide the reader in the correct installation and operation of the FX2N-64DNET DeviceNet Interface Block. It should be read and understood befre attempting to install or use the unit.
- Further infomation can be found in the hardware manual for connecting main unit, FX Series Programming Manual and manual of DeviceNet master units.
- If in doubt at any stage of the installation of FX2N-64DNET DeviceNet Interface Block always consult a professional electrical engineer who is qualified and trained to the local and national standards which apply to the installation site.
- If in doubt about the operation or use of FX2N-64DNET DeviceNet Interface Block please consult the nearest Mitsubisi Electric distributor.
- This manual is subject to change without notice.

FX2N-64DNET DeviceNet Interface Block

User's Manual

Manual number : JY992D86301
Manual revision : A
Date : April 2000

MITSUBISHI

Guidelines for the Safety of the User and Protection of the FX2N-64DNET DeviceNet Interface Block.

This manual provides information for the use of the FX2N-64DNET DeviceNet Interface Block. The manual has been written to be used by trained and competent personnel. The definition of such a person or persons is as follows:

a) Any engineer who is responsible for the planning, design and construction of automatic equipment using the product associated with this manual, should be of a competent nature, trained and qualified to the local and national standards required to fulfill that role. These engineers should be fully aware of all aspects of safety with regards to automated equipment.

b) Any commissioning or service engineer must be of a competent nature, trained and qualified to the local and national standards required to fulfill that job. These engineers should also be trained in the use and maintenance of the completed product. This includes being completely familiar with all associated documentation for said product. All maintenance should be carried out in accordance with established safety practices.

c) All operators of the completed equipment should be trained to use that product in a safe and coordinated manner in compliance to established safety practices. The operators should also be familiar with documentation which is connected with the actual operation of the completed equipment.

Note : The term ‘completed equipment’ refers to a third party constructed device which contains or uses the product associated with this manual.

Note's on the Symbols Used in this Manual

At various times through out this manual certain symbols will be used to highlight points of information which are intended to ensure the users personal safety and protect the integrity of equipment. Whenever any of the following symbols are encountered its associated note must be read and understood. Each of the symbols used will now be listed with a brief description of its meaning.

Hardware Warnings

1) Indicates that the identified danger **WILL** cause physical and property damage.

2) Indicates that the identified danger could **POSSIBLY** cause physical and property damage.

3) Indicates a point of further interest or further explanation.

Software Warnings

4) Indicates special care must be taken when using this element of software.

5) Indicates a special point which the user of the associate software element should be aware.

6) Indicates a point of interest or further explanation.

- Under no circumstances will Mitsubishi Electric be liable responsible for any consequential damage that may arise as a result of the installation or use of this equipment.
- All examples and diagrams shown in this manual are intended only as an aid to understanding the text, not to guarantee operation. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.
- Owing to the very great variety in possible application of this equipment, you must satisfy yourself as to its suitability for your specific application.

Table of Contents

Guideline iii

1. Introduction 1-1
- 1.1 Features of the 64DNET 1-1
- 1.2 External Dimensions and Each Part Name 1-2
- 1.3 System Configuration 1-4
- 1.4 Applicable PLC 1-5

2. Wiring and Mounting 2-1
- 2.1 Mounting 2-1
  - 2.1.1 Arrangements 2-1
  - 2.1.2 Mounting 2-2
- 2.2 Wiring 2-3
  - 2.2.1 Caution 2-3
  - 2.2.2 Wiring 2-4
  - 2.2.3 Terminating Resistor 2-4

3. Specifications 3-1
- 3.1 General Specifications 3-1
- 3.2 Power Supply Specifications 3-1
- 3.3 Performance Specifications 3-2

4. Allocation of Buffer Memories (BFMs) 4-1
4.1 Buffer Memories (BFM) Lists 4-2
4.2 DeviceNet LINK Enable <BFM #0> (Read/Write) 4-8
4.3 Module Status about Connection <BFM #1> (Read Only) 4-9
4.4 Module Status about DeviceNet <BFM #2> (Read Only) 4-10
4.5 Number of DeviceNet UCMM Connections <BFM #3> (Read/Write) 4-11
4.6 DeviceNet Bus-off Counter <BFM #4> (Read/Write) 4-11
4.7 Number of DeviceNet Retries <BFM #5> (Read/Write) 4-12
4.8 FROM/TO WDT Setting <BFM #6> (Read/Write) 4-13
4.9 Mode Control Flags <BFM #7> (Read/Write) 4-14
4.10 UCMM Client Connection Setting <BFM #8 ~ #11> (Read/Write) 4-15
4.11 UCMM Client Sending Trigger <BFM #12 ~ #15> (Read/Write) 4-16
4.12 UCMM Client Receiving Status <BFM #16 ~ #19> (Read Only) 4-17
4.13 UCMM Server Receiving Status <BFM #20 ~ #23> (Read Only) 4-18
4.14 Error Status <BFM #26 ~ #29> (Read Only) 4-19
4.15 Module ID Code <BFM #30> (Read Only) 4-19
4.16 UCMM Client WDT switch <BFM #32 ~ #35> (Read/Write) 4-20
4.17 UCMM Client Connection Status <BFM #36 ~ #39> (Read Only) 4-21
4.18 UCMM Client Communication Status <BFM #40 ~ #43> (Read Only) 4-22
4.19 UCMM Server Communication Status <BFM #44 ~ #47> (Read Only) 4-23
4.20 Baud Rate <BFM #48> (Read Only) 4-24
4.21 Master/Slave Communication Data Area <BFM #100 ~ #133> 4-24
4.21.1 Send Data/Receive Data Area <BFM #100 ~ #131> (Read/Write) 4-25
4.21.2 Number of Link Points <BFM #132> (Read/Write) 4-26
4.21.3 MAC ID <BFM #133> (Read Only) 4-26

4.22 UCMM Client Communication Data Area <BFM #10000 ~ #16336> 4-27
4.22.1 Send Data/Receive Data Area <BFM #1□□00*1 ~ #1□□31*1> (Read/Write) 4-27
4.22.2 Length of Assembly Data <BFM #1□□32*1> (Read/Write) 4-29
4.22.3 Length of Sending Common Service Data <BFM #1□□33*1> (Read/Write) 4-29
4.22.4 Length of Receiving Data <BFM #1□□34*1> (Read Only) 4-30
4.22.5 Group Selection <BFM #1□□35*1> (Read/Write) 4-30
4.22.6 Class ID and Instance ID <BFM #1□□36*1> 4-31
4.22.7 Attribute ID and Service Code <BFM #1□□37*1> 4-32
4.23 UCMM Server Communication Data Area <BFM #20000 ~ #26336> 4-33
4.23.1 Send/Receive Data Area <BFM #2□□00*1 ~ #2□□31*1> (Read/Write) 4-33
4.23.2 Length of Assembly Data <BFM #2□□32*1> (Read/Write) 4-35
4.23.3 Length of Sending Common Service Data <BFM #2□□33*1> (Read/Write) 4-35
4.23.4 Length of Receiving Data <BFM #2□□34*1> (Read Only) 4-36
4.23.5 Group Select <BFM #2□□35*1> (Read Only) 4-36
4.23.6 Class ID and Instance ID <BFM #2□□36*1> (Read only) 4-37
4.23.7 Attribute ID and Service Code <BFM #2□□37*1> (Read only) 4-37

5. DIP Switch Setting 5-1
5.1 Setting DIP Switch 5-1
5.1.1 Mode Setting (DIP Switch: SW0, SW1) 5-1
5.1.2 Baud Rate Setting (DIP Switch: DR0, DR1) 5-2
5.1.3 MAC ID Setting (DIP Switches: NA0 ~ NA5) 5-3

6. Client/Sever Communication by UCMM Connection 6-1
6.1 Information of UCMM Connection by 64DNET 6-1
6.2 How to Use Peer to Peer Communication 6-2

7. Example Program.....7-1
7.1 System Configuration.....7-1
7.2 Operation.....7-2
7.3 Example Program.....7-3
7.3.1 Initial Setting.....7-4
7.3.2 Checking Error Status.....7-8
7.3.3 Input Data and Output Data for Master/Slave I/O Connection.....7-9
7.3.4 Input Data and Output Data for UCMM Connection.....7-10

8. Diagnostics.....8-1
8.1 Preliminary Checks.....8-1
8.2 LED Check.....8-2
8.3 Error Code.....8-5
8.3.1 64DNET Error Code (BFM #7 Bit 1 is ON).....8-5
8.3.2 DeviceNet Error Code (BFM #7 Bit 1 is OFF).....8-18

Appendix A
EDS (Electric Data Sheet).....A-1

Appendix B
Class ID, Instance ID, Attribute ID and Service Code B-1
B-1: Identity (0x01) B-1
B-2: Message Router (0x02) B-2
B-3: DeviceNet (0x03) B-3
B-4: Assembly (0x04) B-5
B-5: Connection (0x05) B-6
B-6: Acknowledge Handler Object (2B Hex) B-12

Appendix C
List of Further Information Manual C-1

1. Introduction

1.1 Features of the 64DNET

The FX_{2N}-64DNET DeviceNet Interface Block (hereafter called “64DNET”) can be used to connect FX_{0N} and FX_{2N} series programmable controller to a DeviceNet network (hereafter called “DeviceNet”). The 64DNET is a slave (Group 2) on DeviceNet.

- The 64DNET passed the conformance test with A-14 for DeviceNet. (The 64DNET conforms to the DeviceNet specifications Volume 1 release 2.0 and Volume 2 release 2.0.)
- The 64DNET can communicate to the master by the Master/Slave communication (using the Master/Slave I/O connection), and can communicate to other node of supporting the UCMM connection by Client/Server communication (using the UCMM connection).
- Communication Data Length;
  - The Master/Slave communication will both send and receive 64 bytes of data to/from the master.
  - The Client/Sever communication will both send and receive 64 bytes of data to/from each node.
- The communication method for I/O connection supports “polling”, “cyclic” and “change of state”.
- The MAC ID and baud rate is adjusted by DIP switches. See chapter 5.
- The communication between the connected main unit and the internal buffer memory of the 64DNET is handled by FROM/TO instructions.

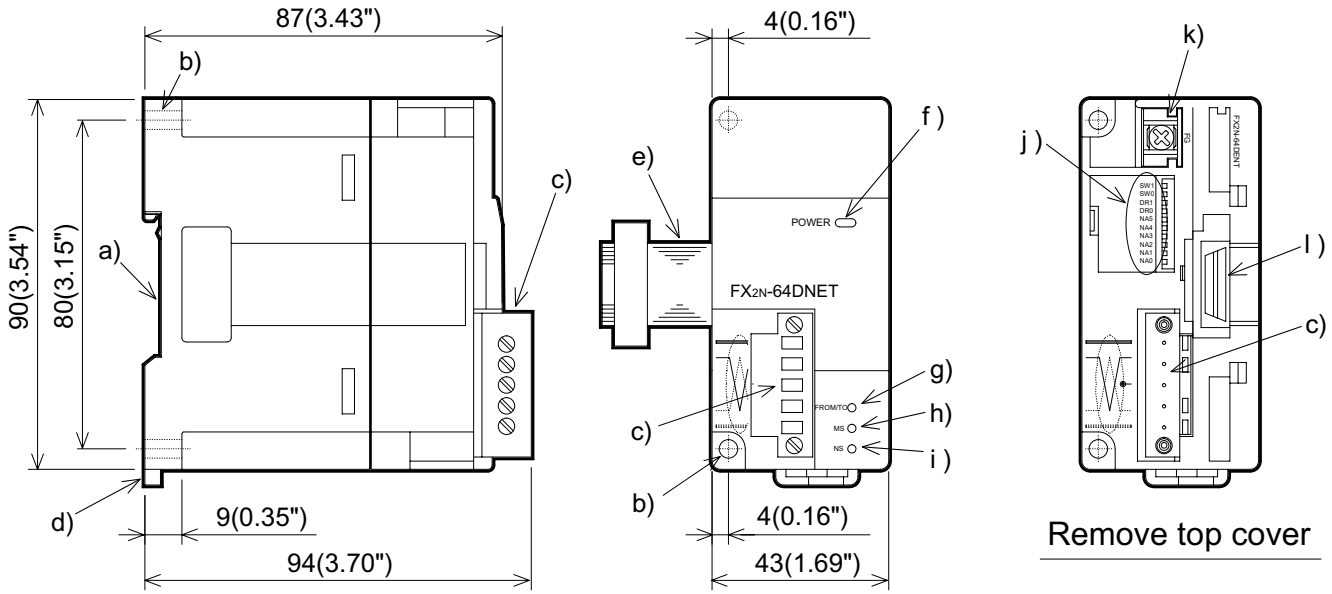
DeviceNet is a registered trademark of the Open DeviceNet Vendor Association, Inc.

1.2 External Dimensions and Each Part Name

Dimensions: mm (inches) MASS (Weight):Approx. 0.2 kg (0.44 lbs)

Accessory: Special block No. label

Figure 1.1: External Dimensions

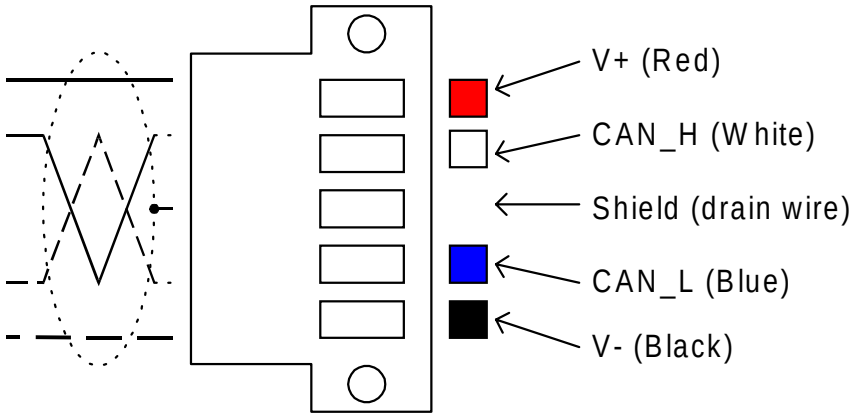


a) Groove for mounting DIN rail (DIN46277) <DIN rail width: 35mm (1.38")>

b) Direct mounting hole (2-ϕ4.5 (0.18"))

c) Connector for connecting DeviceNet communication cable

Figure 1.2: Connector layout



d) Hook for mounting DIN rail

e) Extension cable

f) POWER LED:

g) FROM/TO LED

h) MS LED (Module Status LED)

i) NS LED (Network Status LED)

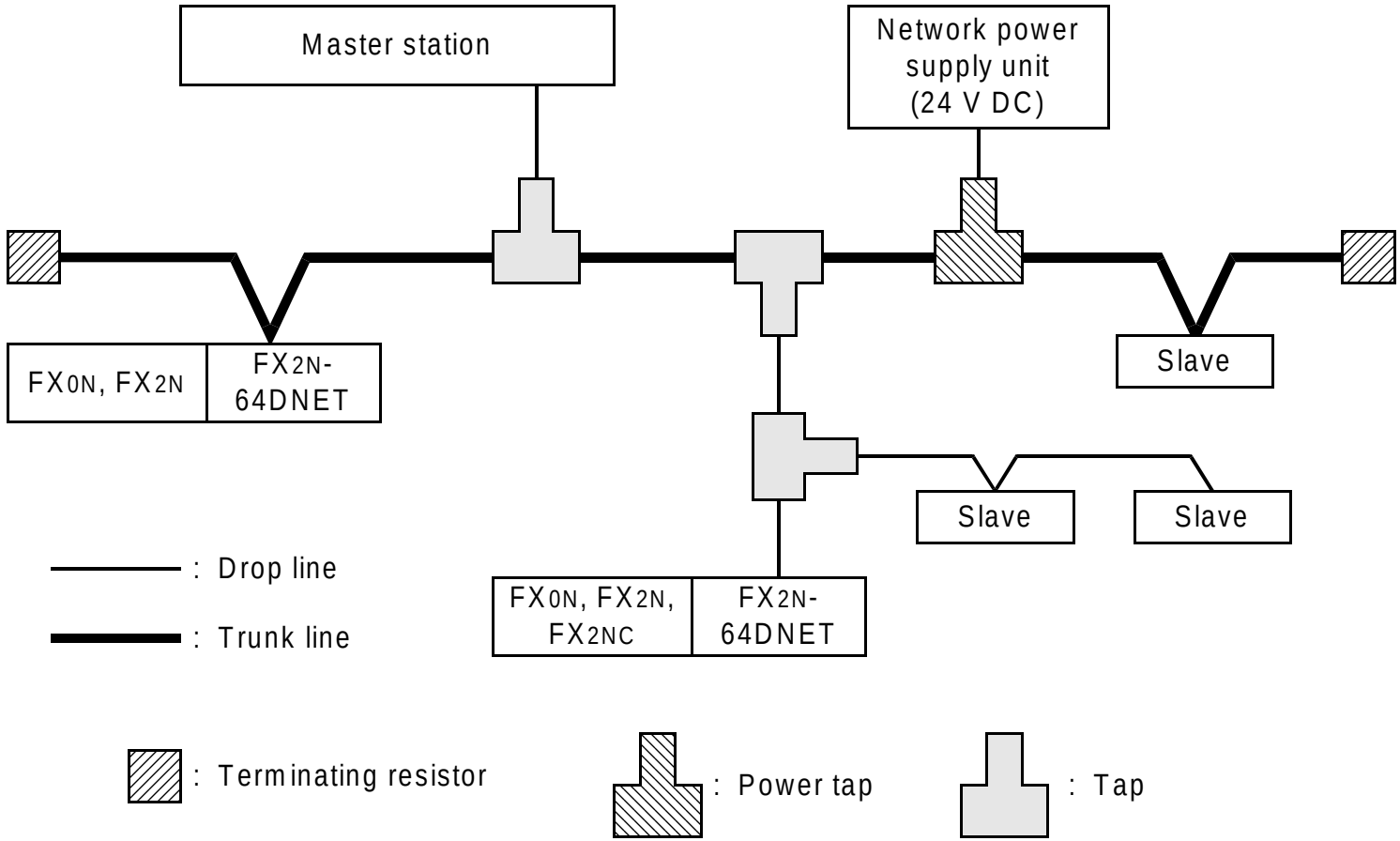
j) DIP switch for setting the MAC ID, baud rate and operation mode. See chapter 5.

k) FG Terminal (screw terminal: M3 (0.12"))

l) Connector for connecting extension cable

1.3 System Configuration

Figure 1.3: System Configuration



1.4 Applicable PLC

Table 1.1: Agreement PLC

Programmable Controllers	Description
FX_{0N} series	All products
FX_{2N} series	

MEMO

2. Wiring and Mounting

2.1 Mounting

2.1.1 Arrangements

The 64DNET connects on the right side of connected main unit or extension unit/block (including special function blocks). For further information of mounting arrangements, refer to the hardware manual of the connected main unit.

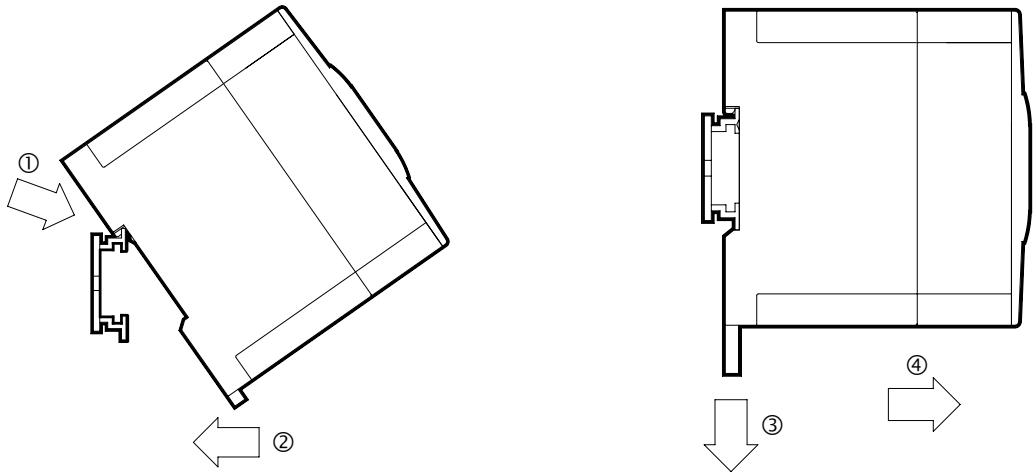
2.1.2 Mounting

The mounting method of the 64DNET can be DIN rail mounting or direct wall mounting.

1) DIN rail mounting

- Align the upper side of the DIN rail mounting groove of the 64DNET with a DIN rail*1 (①), and push it on the DIN rail(②). See Figure 2.1.
- When removing the 64DNET from the DIN rail, the hook for DIN rail is pulled (③), and the 64DNET is removed (④). See Figure 2.1.

Figure 2.1: Attach to DIN Rail and Remove from DIN Rail



*1 Uses DIN 46277 <35mm (1.38")>

2) Direct mounting to back walls

The 64DNET can be mounted with the M4 screw by using the direct mounting hole. However, an interval space between each unit of 1 ~ 2 mm is necessary.

2.2 Wiring

2.2.1 Caution

1) Do not lay signal cable near to high voltage power cable or house them in the same trunking duct. Effects of noise or surge induction may occur. Keep signal cables a safe distance of more than 100 mm (3.94") from these power cables.

2) The terminal screws of the 64DNET are M3 (0.12"), therefore the crimp style terminal (see drawing) suitable for use with these screws should be fitted to the cable for wiring.

Figure 2.2: Crimp Terminals

3) The terminal tightening torque is 0.5 ~ 0.8 N·m. Tighten securely to avoid malfunction.

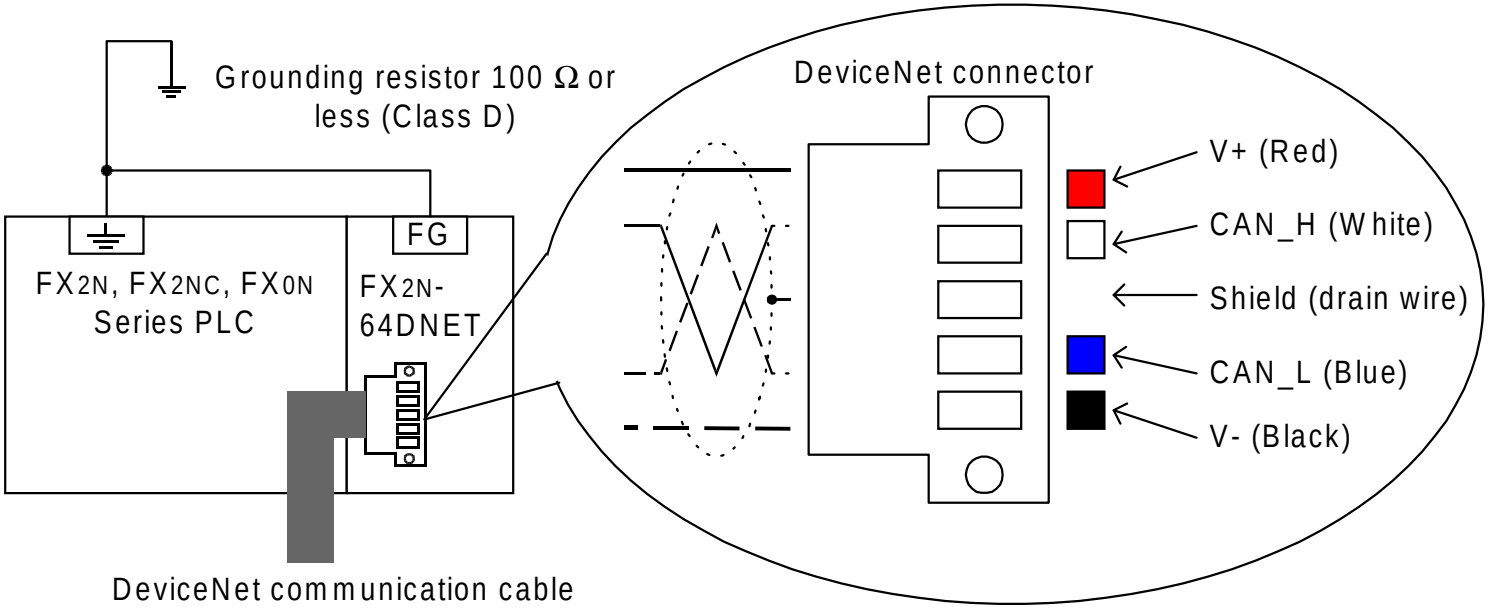
4) Cut off all phases of power source before installation or performing wiring work in order to avoid electric shock or damage of product.

5) Replace the provided terminal cover before supplying power and operating the unit after installation or wiring work in order to avoid electric shock.

2.2.2 Wiring

Connects Each color code of DeviceNet communication cable to same color part in DeviceNet connector.

Figure 2.3: Wiring



2.2.3 Terminating Resistor

The units at each end of the DeviceNet must have a terminating resistor.

However, the 64DNET does not have a terminating resistance built-in.

3. Specifications

3.1 General Specifications

Table 3.1: General Specifications

Items	Description
General specifications excluding Dielectric Withstand Voltage	Same as those of the main unit
Dielectric Withstand Voltage	500 V AC > 1 min, tested between DC power line in the DeviceNet connector and ground
Complies with	EN50325 (conformance tested with A-14)

3.2 Power Supply Specifications

Table 3.2: Power Supply Specifications

Items	Description
Power Supply For Communication	50 mA at 24 V DC supplied from V+, V- terminals
Internal Power Supply	120 mA at 5 V DC supplied via extension cable

3.3 Performance Specifications

Table 3.3: Performance Specifications

Items				Specifications
Node Type				G2 server
Station Numbers				0 ~ 63
Transmission Cable				Shielded twisted-pair cable conformed with DeviceNet specifications
MAC ID				0 ~ 63
Supported Baud Rates				125 kbps, 250 kbps, 500 kbps
Maximum Cable Length				See Note 1.
Communication Data	Explicit Connection	Predefined Master/Slave Connection Set	Number of Connection	1 (Group 2)
			Transmis-sion Time-out	2,000 ms (ACK time-out)
		UCMM Client/ Server Connec-tion	Number of Connection	63/63 (Group 1, 3) <recommend group 3>
			Communica-tion Data Length	Sending: Maximum 64 bytes /1 connection Receiving: Maximum 64 bytes/1 connection

Table 3.3: Performance Specifications

Items			Specifications
Communication Data	I/O Connection	Supported Communication Type	Polling, Cyclic, Change of State
		Communication Data Length	Sending: Maximum 64 bytes (Fragmentation is allowed.) Receiving: Maximum 64 bytes (Fragmentation is allowed.)
Applicable PLC			FX_{2N} Series, FX_{0N} Series
Communication with PLC			FROM/TO instruction
Number of Occupied I/O Points			8 points taken from the programmable controller extension bus (can be either input or output)
Module ID Code			K 7090
LED Indicators		POWER LED	Lit when 5 V DC power supplied from main unit or extension unit.
		FROM/TO LED	Lit when 64DNET is accessed from main unit.
		MS LED	See Note 2.
		NS LED	See Note 3.

Note 1; Maximum Cable Length

Table 3.4: Maximum Cable Length

Using Baud Rate	Trunk Line Maximum Cable Length	Drop Line	
		Maximum Length	Maximum Total Length
125 kbps	Thick cable length + 5 × thin cable length ≤ 500 m (1,640')	6 m (20')	156 m (512')
250 kbps	Thick cable length + 2.5 × thin cable length ≤ 250 m (820')		78 m (23')
500 kbps	Thick cable length + thin cable length ≤ 100 m (328')		39 m (128')

Note 2; MS LED Status (Module Status LED)

Table 3.5: MS LED Status (Module Status LED)

MS LED Status	64DNET Status	Description
Not lit	Power OFF	The power supply is insufficient.
Lit Green	Normal Operation	The 64DNET is in normally operation mode.
Flashing Green at 0.5 s intervals	Stand-by	The 64DNET is in stand-by status or setting error.
Flashing Red at 0.5 s intervals	Minor Fault	A recoverable error has occurred.
Lit Red	Unrecoverable Fault	An unrecoverable error has occurred. Please contact a service representative.
Flashing Green and Red at 0.5 s intervals	Self Test	The 64DNET is in self testing mode.

Note 3; NS LED Network Status

Table 3.6: NS LED Status (Network Status LED)

MS LED Status	64DNET Status	Description
Not lit	Not On-line	The 64DNET is not on-line. • The power supply voltage is abnormal. • Dup_MAC_ID test is not finished.
Lit Green	Link OK	The 64DNET is on-line and has established the connection.
Flashing Green at 0.5 s intervals	On-line Status Without Connection	The 64DNET is on-line but has not the established the connection.
Flashing Red at 0.5 s intervals	Communication Time-out	The 64DNET I/O connection is in time-out status.
Lit Red	Critical link Failure	Communication is not possible.
Flashing Green and Red at 0.25 s intervals	Communication Fault	The 64DNET is the Communication Faulted for detecting the Network Accessing Error. After this module will receive the Identify Communication Faulted Request.

Note:

When the power supply is turned on, MS LED and NS LED quickly flashes green, then red, and are turned off. This operation is normal.

MEMO

4. Allocation of Buffer Memories (BFMs)

Caution;

1) Do not access the buffer memory of “Not used” (BFM #24, #25, #31, #50 ~ #99, #134 ~ #999, #1□□37*1 ~ #1□□99*1, #16337 ~ #1999, #2□□37*1 ~ #2□□99*1) by the FROM/TO instruction. There is a possibility to cause abnormal operation of the 64DNET if accessing these buffer memories.

   *1 □□ has a value of 0 ~ 63.

2) Do not write to (access by TO instruction) the buffer memory of “Read only” (BFM #1, #2, #30, #16 ~ #23, #26, #27, #30, #36 ~ #49, #133) in the programmable controller. It is not possible to operate the 64DNET by writing to (accessing by TO instruction) these buffer memories.

Note:

The sending data and receiving data buffers have the same buffer memory addresses (BFM #100 ~ #1031, #1□□00*1 ~ #1□□31*1, #2□□00*1 ~ #2□□31*1) for use with FROM and TO instructions. This means it is not possible to check the buffer memory data using a FROM instruction because this instruction only reads receive buffer data.

*1 □□ has a value of 0 ~ 63.

4.1 Buffer Memories (BFM) Lists

Table 4.1: BFM Lists

BFM #No.	Description		Default Value	FROM/TO Instruction (Read/Write)
	FROM Instruction (Read)	TO Instruction (Write)		
BFM #0	DeviceNet LINK enable		K0	Read /Write
BFM #1	Module status about connection			Read Only
BFM #2	Module status about DeviceNet			
BFM #3	Number of DeviceNet UCMM connections		K0808	Read /Write
BFM #4	DeviceNet bus-off counter		K0	
BFM #5	Number of DeviceNet retries		K2	
BFM #6	FROM/TO WDT (watchdog timer) setting		K20	
BFM #7	Module control flag		K0	
BFM #8 ~ 11	UCMM client connection status			
BFM #12 ~ 15	UCMM client sending trigger			
BFM #16 ~ 19	UCMM client receiving status			Read Only
BFM #20 ~ 23	UCMM server receiving status			
BFM #24,25	Not used			

Table 4.1: BFM Lists

BFM #No.	Description		Default Value	FROM/TO Instruction (Read/Write)
	FROM Instruction (Read)	TO Instruction (Write)		
BFM #26	Error flag		K0	Read Only
BFM #27	Error code			
BFM #28	Error flag latch			Read/Write
BFM #29	Error code latch			
BFM #30	Module ID code		K7090	Read only
BFM #31	Not used			
BFM #32 ~ 35	UCMM client WDT switch		K0	Read/Write
BFM #36 ~ 39	UCMM client connection status			Read only
BFM #40 ~ 43	UCMM client communication status			
BFM #44 ~ 47	UCMM server communication status			
BFM #48	Baud rate		K500	
BFM #49	DIP switch status		H 3F0	
BFM #50 ~ 99	Not used			
BFM #100 ~ 131	Master/Slave receive data	Master/Slave send data	K0	Read/Write
BFM #132	Number of link points for DeviceNet		H0404	
BFM #133	DeviceNet MAC ID		K0	Read only
BFM #134 ~ 999	Not used			

Table 4.1: BFM Lists

BFM #No.	Description			Default Value	FROM/TO Instruction (Read/Write)
		FROM Instruction (Read)	TO Instruction (Write)		
BFM #10000 ~ 10031	UCMM Client 0	Receive data	Send data	K0	Read/Write
BFM #10032		Length of assembly data		H0404	
BFM #10033		Length of sending common service data		K0	
BFM #10034		Length of received data (assembly or common service data)			Read only
BFM #10035		Group select		K3	Read/Write
BFM #10036		DeviceNet class ID and instance ID		K0	
BFM #10037		DeviceNet attribute ID and service ID			
BFM #10038 ~ 10099	Not used				
BFM #10100 ~ 10131	UCMM Client 1	Receive data	Send data	K0	Read/Write
BFM #10132		Length of assembly data		H0404	
BFM #10133		Length of sending common service data		K0	
BFM #10134		Length of received data (assembly or common service data)			Read only
BFM #10135		Group selection		K3	Read/Write
BFM #10136		DeviceNet class ID and instance ID		K0	
BFM #10137		DeviceNet attribute ID and service ID			
BFM #10138 ~ 10199	Not used				

Table 4.1: BFM Lists

BFM #No.	Description			Default Value	FROM/TO Instruction (Read/Write)
		FROM Instruction (Read)	TO Instruction (Write)		
⋮		⋮	⋮	⋮	⋮
BFM #16300 ~ 16331	UCMM Client 63	Receive data	Send data	K0	Read/Write
BFM #16332		Length of assembly data		H0404	
BFM #16333		Length of sending common service data		K0	
BFM #16334		Length of received data (assembly or common service data)			Read only
BFM #16335		Group selection		K3	Read/Write
BFM #16336		DeviceNet class ID and instance ID		K0	
BFM #16337		DeviceNet attribute ID and service ID			
BFM #16338 ~ 19999	Not used				
BFM #20000 ~ 20031	UCMM Server 0	Receive data	Send data	K0	Read/Write
BFM #20032		Length of assembly data		H0404	
BFM #20033		Length of sending common service data		K0	
BFM #20034		Length of received data (assembly or common service data)			Read only
BFM #20035		Group selection		K3	
BFM #20036		DeviceNet class ID and instance ID		K0	
BFM #20037		DeviceNet attribute ID and service ID			

Table 4.1: BFM Lists

BFM #No.	Description		Default Value	FROM/TO Instruction (Read/Write)
	FROM Instruction (Read)	TO Instruction (Write)		
BFM #20038 ~ 20099	Not used			
BFM #20100 ~ 20131	UCMM Server 1 — Receive data		K0	Read only
BFM #20132	UCMM Server 1 — Length of assembly data		H0404	Read/Write
BFM #20133	UCMM Server 1 — Length of sending common service data		K0	
BFM #20134	UCMM Server 1 — Length of received data (assembly or common service data)			Read only
BFM #20135	UCMM Server 1 — Group selection		K3	
BFM #20136	UCMM Server 1 — DeviceNet class ID and instance ID		K0	
BFM #20137	UCMM Server 1 — DeviceNet attribute ID and service ID			
BFM #20138 ~ 20199	Not used			
⋮	⋮	⋮	⋮	⋮

Table 4.1: BFM Lists

BFM #No.	Description			Default Value	FROM/TO Instruction (Read/Write)
		FROM Instruction (Read)	TO Instruction (Write)		
BFM #26300 ~ 26331	UCMM Server 63	Receive data	Send data	K0	Read/Write
BFM #26332		Length of assembly data		H0404	
BFM #26333		Length of sending common service data		K0	
BFM #26334		Length of received data (assembly or common service data)			Read only
BFM #26335		Group selection		K3	
BFM #26336		DeviceNet class ID and instance ID		K0	
BFM #26337		DeviceNet attribute ID and service ID			

4.2 DeviceNet LINK Enable <BFM #0> (Read/Write)

This buffer memory is used to enable the 64DNET on DeviceNet.

Table 4.2: DeviceNet LINK Enable <BFM #0>

Value	Description
K0	The 64DNET is off-line on DeviceNet.
K1	The 64DNET is on-line on DeviceNet.
Otherwise	Not used

4.3 Module Status about Connection <BFM #1> (Read Only)

This buffer memory is used for checking connection status of the 64DNET.
The connection status is allocated as follows.

Table 4.3: Module Status about Connection <BFM #1>

Bit No.	Name	Description	
		ON (1)	OFF (0)
Bit 0	Master/Slave I/O Connection	The 64DNET connects to the master station by I/O connection.	The 64DNET does not connect to the master station by I/O Connection.
Bit 1	Master/Slave Explicit Messaging Connection	The 64DNET connects to the master station by Explicit Connection.	The 64DNET does not connect to the master station by Explicit Connection.
Bit 2	UCMM Connection	The 64DNET connects to the other node by the UCMM Connection.	The 64DNET does not connect to the other node by the UCMM Connection.
Bit 3 ~ 15	Not used		

4.4 Module Status about DeviceNet <BFM #2> (Read Only)

This buffer memory is used for checking the DeviceNet link status of the 64DNET.
The value of this buffer memory's mean shows bellow table.

Table 4.4: Module Status about DeviceNet <BFM #2>

Value	64DNET Status	MS LED Status	Description
K0	Power off	Not lit	The power supply is insufficient.
K10	Device Self test	Flashing Green and Red at 0.5 s interval	The 64DNET is in self-testing status.
K30	Device operational (On-line)	Lit Green	The 64DNET is on-line in normally operation.
K31	Device operational (Off-line)		The 64DNET is off-line in normally operation.
K50	Unrecoverable Fault	Lit Red	An unrecoverable error has occurred. Please contact a service representative.

4.5 Number of DeviceNet UCMM Connections <BFM #3> (Read/Write)

This buffer memory is used for setting or checking the number of the UCMM Connections on the DeviceNet.
The setting Range of client is 00 ~ 40 hex, and the setting range of server is 01 ~ 40 hex. Default value is 0808 hex (client: Max. 8 connection, server: Max. 8 connection)

Figure 4.1: Number of DeviceNet UCMM Connections <BFM #3>

	Upper byte	Lower byte
BFM #3	Client (Hex code)	Server (Hex code)

4.6 DeviceNet Bus-off Counter <BFM #4> (Read/Write)

This buffer memory is used for checking the number of times the bus-off has occurred on the DeviceNet. To reset a bus off counter, this buffer memory writes and has permitted only “K0”. Default value is “K0”.

Note:

If any increase in this value, 64DNET does not have stable communication on DeviceNet. Please check wiring and settings.

4.7 Number of DeviceNet Retries <BFM #5> (Read/Write)

This buffer memory is used for setting number of DeviceNet retries on the UCMM connection. Default value is K2. This setting range is 0 ~ 255.

Note:

This process is performed only if the UCMM client WDT switch is ON. For the UCMM client WDT switch information, refer to section 4.16.

4.8 FROM/TO WDT Setting <BFM #6> (Read/Write)

This buffer memory is used for setting the FROM/TO WDT. This WDT is adjusted in 10 ms steps. Default value is 20 (20 × 10 ms = 200 ms). When this value is 0, the watchdog timer is disabled. When all BFMs (BFM #0 ~ #26337) are not accessed by FROM/TO instructions, the watchdog timer begins operating.

Caution:

1) Using the Master/Slave communication (Master/Slave connection)

   If the watchdog timer reaches the set time (BFM #6 × 10 ms), the 64DNET is in WDT time-out status. At this time, the 64DNET will store error codes (BFM #27, #29), set error flags (BFM #26, #28), and all the send data from the slave to the master station is cleared. However, 64DNET does not stop all data exchange to the master station. The 64DNET will send “K0” to the master station.

   Please the PLC access the BFMs (one or more) each time as in the example program (see section 6.3).

2) Using the Client/Server communication (UCMM connection)

   In this case, the connection of the UCMM connection follows the UCMM Client WDT switch setting (BFM #32 ~ #35). For UCMM Client WDT switch information, refer to section 4.16.

4.9 Mode Control Flags <BFM #7> (Read/Write)

This buffer memory is used for changing mode of the receiving data flag and contents of error code. For error code, refer to chapter 9.

Table 4.5: Mode Control Flags

Bit No.	Name	Description	
		OFF (0)	ON (1)
Bit 0	Receiving mode	See Note	
Bit 1	Error code type	Upper byte: general error code Lower byte: additional error code	Upper byte: service type Lower byte: detailed error code
Bit 2 ~ 15	Not used		

Note:

When this bit 1 is turned ON, 64DNET does not receive new data from other nodes to which the receiving data flag (the UCMM client receiving status and the UCMM server receiving status) is turned ON. When the reception flag is turned OFF, new reception data can be received.

When this bit 1 is turned OFF, 64DNET will receive new data from other node to which the receiving data flag is turned ON. If the PLC does not read data from BFMs of receiving data area, this data will be replaced by new data.

4.10 UCMM Client Connection Setting <BFM #8 ~ #11> (Read/Write)

These buffer memories are used for connecting to the server by the UCMM connection.
Turn On MAC ID server bit to connect the 64DNET as a client via the UCMM connection. The allocation of the bits is as shown in the table below.

Table 4.6: UCMM Client Connection Setting <BFM #8 ~ #11>

BFM No.	BIt No.	MAC ID
BFM #8	Bit 0	0
	Bit 1	1
	Bit 2	2
	: :	: :
	Bit 15	15
BFM #9	Bit 0	16
	Bit 1	17
	Bit 2	18
	: :	: :
	Bit 15	31

BFM No.	BIt No.	MAC ID
BFM #10	Bit 0	32
	Bit 1	33
	Bit 2	34
	: :	: :
	Bit 15	47
BFM #11	Bit 0	18
	Bit 1	19
	Bit 2	50
	: :	: :
	Bit 15	63

Caution:

If the connection is cut while sending or receiving data, the 64DNET will not finish sending/ receiving the interrupted data. the data may not be correct or complete.

4.11 UCMM Client Sending Trigger <BFM #12 ~ #15> (Read/Write)

These buffer memories are used for sending data to the server to which 64DNET is connected by the UCMM connection of the client.

When sending data (BFM #1□□00[*1] ~ #1□□31[*1]), the bit which corresponds to the server destination is turned OFF → ON. After the data (BFM #1□□00[*1] ~ #1□□31[*1]) is sent, this bit is automatically turned OFF. The allocation of the bits is as shown in the table below.

For BFM #1□□00[*1] ~ #1□□31[*1], refer to section 4.23.

Table 4.7: UCMM Client Sending Trigger <BFM #12 ~ #15>

BFM No.	BIt No.	MAC ID
BFM #12	Bit 0	0
	Bit 1	1
	Bit 2	2
	: :	: :
	Bit 15	15
BFM #13	Bit 0	16
	Bit 1	17
	Bit 2	18
	: :	: :
	Bit 15	31

BFM No.	BIt No.	MAC ID
BFM #14	Bit 0	32
	Bit 1	33
	Bit 2	34
	: :	: :
	Bit 15	47
BFM #15	Bit 0	18
	Bit 1	19
	Bit 2	50
	: :	: :
	Bit 15	63

*1 The □□ is entered value of 0 ~ 63.

4.12 UCMM Client Receiving Status <BFM #16 ~ #19> (Read Only)

These buffer memories are used for reading received data from the server to which 64DNET is connected by the UCMM connection of the client.
When receiving data from server, the bit which corresponds to the server of the destination is turned OFF → ON. After the PLC reads data from BFMs (BFM #1□□00*1 ~ #1□□31*1) in the received data area for the server, this bit automatically is turned OFF. The allocation of the bits is as shown in the table below. For BFM #1□□00*1 ~ #1□□31*1, refer to section 4.23.

Table 4.8: UCMM Client Receiving Status <BFM # 16~ #19>

BFM No.	BIt No.	MAC ID
BFM #16	Bit 0	0
	Bit 1	1
	Bit 2	2
	:	:
	Bit 15	15
BFM #17	Bit 0	16
	Bit 1	17
	Bit 2	18
	:	:
	Bit 15	31

BFM No.	BIt No.	MAC ID
BFM #18	Bit 0	32
	Bit 1	33
	Bit 2	34
	:	:
	Bit 15	47
BFM #19	Bit 0	18
	Bit 1	19
	Bit 2	50
	:	:
	Bit 15	63

*1 The □□ is entered value of 0 ~ 63.

4.13 UCMM Server Receiving Status <BFM #20 ~ #23> (Read Only)

These buffer memories are used for reading received data from the client to which 64DNET (server) is connected by the UCMM connection.
When receiving data from the client, the bit which corresponds to the server is turned OFF → ON. After the PLC reads data from BFMs (BFM #2□□00[*1] ~ #2□□31[*1]) in the received data area for the client, this bit automatically is turned OFF. The allocation of the bits is as shown in the table below. For BFM #1□□00[*1] ~ #1□□31[*1], refer to section 4.24.

Table 4.9: UCMM Client Connection Setting

BFM No.	BIt No.	MAC ID
BFM #20	Bit 0	0
	Bit 1	1
	Bit 2	2
	: :	: :
	Bit 15	15
BFM #21	Bit 0	16
	Bit 1	17
	Bit 2	18
	: :	: :
	Bit 15	31

BFM No.	BIt No.	MAC ID
BFM #22	Bit 0	32
	Bit 1	33
	Bit 2	34
	: :	: :
	Bit 15	47
BFM #23	Bit 0	18
	Bit 1	19
	Bit 2	50
	: :	: :
	Bit 15	63

*2 The □□ is entered value of 0 ~ 63.

4.14 Error Status <BFM #26 ~ #29> (Read Only)

These buffer memories are used for checking error status and error codes.
If an error occurs, the 64DNET stores "K1" to BFM #26 and #28. At the same time, the 64DNET stores the error code to BFM #27 and #29. However, if the error automatically recovers, BFM #26 and #27 will be cleared by 64DNET. BFM #28 and #29 are not cleared. BFM #28 and #29 can be cleared by the PLC when writing "K0" to these BFMs by the TO instruction.
For error codes, refer to chapter 8.

Table 4.10: Error Status <BFM #26, #28>

BFM No.	Name	Description		
		K0	K1	K2 or more
BFM #26	Present error flag	Normal operation (BFM #27 is cleared by 64DNET)	Occurred Error (error code is stored BFM #27)	Not used
BFM #28	Error flag latch	Normal operation	Occurred Error (error code is stored BFM #29)	

4.15 Module ID Code <BFM #30> (Read Only)

The identification code for a 64DNET is read by using the FROM instruction. The identification code for the 64DNET is “K7090”. By reading this identification code, the user may create built-in checking routines to check whether the physical position of 64DNET matches to that software.

4.16 UCMM Client WDT switch <BFM #32 ~ #35> (Read/Write)

These buffer memories are used for setting either to cut off the connection or not cut off the connection, when the time-out occurs in the Explicit Message.
If the MAC ID bit is ON, an Explicit error time out does not cut off the connection to the server. The allocation of the bits is as shown in the table below.

Table 4.11: UCMM Client WDT Switch <BFM #32 ~ #35>

BFM No.	BIt No.	MAC ID	Description	
			ON (1)	OFF (0)
BFM #32	Bit 0	0	Does not cut off connection for a server when time-out occurs in Explicit Message	Cuts off connection for a server when time-out occurs in Explicit Message
	Bit 1	1		
	Bit 2	2		
	: :	: :		
	Bit 15	15		
BFM #33	Bit 0	16		
	Bit 1	17		
	Bit 2	18		
	: :	: :		
	Bit 15	31		

BFM No.	BIt No.	MAC ID	Description	
			ON (1)	OFF (0)
BFM #34	Bit 0	32	Does not cut off connection for a server when time-out occurs in Explicit Message	Cuts off connection for a server when time-out occurs in Explicit Message
	Bit 1	33		
	Bit 2	34		
	: :	: :		
	Bit 15	47		
BFM #35	Bit 0	18		
	Bit 1	19		
	Bit 2	50		
	: :	: :		
	Bit 15	63		

4.17 UCMM Client Connection Status <BFM #36 ~ #39> (Read Only)

These buffer memories are used for checking if the server has server been connected.
The bit which corresponds to the MAC ID of the server to which 64DNET has connected previously as a client is turned ON. The allocation of the bits is as shown in the table below.

Table 4.12: UCMM Client Connection Status <BFM #36 ~ #39>

BFM No.	BIt No.	MAC ID
BFM #36	Bit 0	0
	Bit 1	1
	Bit 2	2
	: :	: :
	Bit 15	15
BFM #37	Bit 0	16
	Bit 1	17
	Bit 2	18
	: :	: :
	Bit 15	31

BFM No.	BIt No.	MAC ID
BFM #38	Bit 0	32
	Bit 1	33
	Bit 2	34
	: :	: :
	Bit 15	47
BFM #39	Bit 0	18
	Bit 1	19
	Bit 2	50
	: :	: :
	Bit 15	63

4.18 UCMM Client Communication Status <BFM #40 ~ #43> (Read Only)

These buffer memories are used to check the status of correct server communication.
The bit which corresponds to the MAC ID of the server to which 64DNET communicates correctly as a client is turned ON. The allocation of the bit is as shown in the table below.

Table 4.13: UCMM Client Communication Status <BFM #40 ~ #43>

BFM No.	BIt No.	MAC ID
BFM #40	Bit 0	0
	Bit 1	1
	Bit 2	2
	: :	: :
	Bit 15	15
BFM #41	Bit 0	16
	Bit 1	17
	Bit 2	18
	: :	: :
	Bit 15	31

BFM No.	BIt No.	MAC ID
BFM #42	Bit 0	32
	Bit 1	33
	Bit 2	34
	: :	: :
	Bit 15	47
BFM #43	Bit 0	18
	Bit 1	19
	Bit 2	50
	: :	: :
	Bit 15	63

4.19 UCMM Server Communication Status <BFM #44 ~ #47> (Read Only)

These buffer memories are used for checking the status of client. connection
The bit which corresponds to the MAC ID of the client to which 64DNET is connected by client is turned ON. The allocation of the bits is as shown in the table below.

Table 4.14: UCMM Server Communication Status <BFM #44 ~ #47>

BFM No.	BIt No.	MAC ID
BFM #44	Bit 0	0
	Bit 1	1
	Bit 2	2
	: :	: :
	Bit 15	15
BFM #45	Bit 0	16
	Bit 1	17
	Bit 2	18
	: :	: :
	Bit 15	31

BFM No.	BIt No.	MAC ID
BFM #46	Bit 0	32
	Bit 1	33
	Bit 2	34
	: :	: :
	Bit 15	47
BFM #47	Bit 0	18
	Bit 1	19
	Bit 2	50
	: :	: :
	Bit 15	63

4.20 Baud Rate <BFM #48> (Read Only)

This buffer memory is used for checking the baud rate.
This value is the baud rate. When 64DNET starts, the value set with DIP switches is stored in this buffer memory. For setting the baud rate, refer to subsection 5.1.2.

Note:

The baud rate cannot be changed by the DIP switches when the 64DNET is ON. Please turn 64DNET off to change the DIP switch positions.

4.21 Master/Slave Communication Data Area <BFM #100 ~ #133>

This area is used for I/O connection.

4.21.1 Send Data/Receive Data Area <BFM #100 ~ #131> (Read/Write)

These buffer memories are used to send/receive data to/from the master.

Table 4.15: Send Data/Receive Data Area <BFM #100 ~ #131>

BFM No.	Description			
	Send Data (using TO Instruction)		Receive Data (using FROM Instruction)	
	Upper Byte	Lower Byte	Upper Byte	Lower Byte
BFM #100	2nd byte	1st byte	2nd byte	1st byte
BFM #101	4th byte	3rd byte	4th byte	3rd byte
BFM #102	6th byte	5th byte	6th byte	5th byte
: :	: :		: :	
BFM #131	64th byte	63th byte	64th byte	63th byte

Note:

- The sending data and receiving data buffers have the same buffer memory addresses (BFM #100 ~ #131) for use with FROM and TO instructions. This means it is not possible to check the buffer memory data using a FROM instruction because this instruction only reads receive buffer data.
- Buffer Memories (BFM #100 ~ #131) are only refreshed for the number of bytes decided by BFM #132.
  Therefore, when less data is received from the master compared to the previous time, some data remains from the prior message.

4.21.2 Number of Link Points <BFM #132> (Read/Write)

This buffer memory is used for setting number of link points of the I/O connection.
The 64DNET can exchange maximum 64 bytes to the master. Default value is H0404 (Hex code). The setting range of the upper and lower bytes is H01 to H40.

Figure 4.2: Number of Points <BFM #132>

	Upper byte	Lower byte
BFM #132	Send data (Hex code)	Receive data (Hex code)

4.21.3 MAC ID <BFM #133> (Read Only)

This buffer memory is used for checking the MAC ID of master and 64DNET I/O connection.
The upper byte is the MAC ID of the master. The lower byte is the MAC ID of the 64DNET. The MAC ID of 64DNET is stored to the lower byte during start up.

Figure 4.3: MAC ID <BFM #133>

	Upper byte	Lower byte
BFM #133	Master (Hex code)	64DNET (Hex code)

4.22 UCMM Client Communication Data Area <BFM #10000 ~ #16336>

This area is used for the UCMM connection when 64DNET is a client.

4.22.1 Send Data/Receive Data Area <BFM #1□□00*1 ~ #1□□31*1> (Read/Write)

These buffer memories are used to send/receive data to/from the server. The buffer memory for send/receive data is allocated as in table 4.16.

Note:

- The send data and receive data buffers have the same buffer memory addresses (BFM #1□□00*1 ~ #1□□31*) for use with FROM and TO instructions. This means it is not possible to check the buffer memory data using a FROM instruction because this instruction only reads receive buffer data.
- Buffer Memories (BFM #1□□00*1 ~ #1□□31*) are only refreshed for the number of bytes decided by BFM #1□□32.
  Therefore, when less data is received from the master compared to the previous time, some data remains from the prior message.

*1 □□ has a value of 0 ~ 63. This value is the MAC ID of the server.

Table 4.16: Send Data/Receive Data Area <BFM #1□□00*1 ~ #1□□31*1>

BFM No.	Description			
	Send Data (using TO Instruction)		Receive Data (using FROM Instruction)	
	Upper Byte	Lower Byte	Upper Byte	Lower Byte
BFM #1□□00*1	2nd byte	1st byte	2nd byte	1st byte
BFM #1□□01*1	4th byte	3rd byte	4th byte	3rd byte
BFM #1□□02*1	6th byte	5th byte	6th byte	5th byte
: :	: :		: :	
BFM #1□□31*1	64th byte	63th byte	64th byte	63th byte

*1 □□ has a value of 0 ~ 63. This value is the MAC ID of the server.

4.22.2 Length of Assembly Data <BFM #1□□32*1> (Read/Write)

These buffer memories are used for setting length of assembly data about the connected to the server. The 64DNET can exchange maximum 64 bytes to the server. Default value is H0404 (Hex code). The setting range of the upper and lower bytes is H01 to H40.

Figure 4.4: Length of Assembly Data <BFM #1□□32*1>

	Upper byte	Lower byte
BFM #1□□32	Send data (Hex code)	Receive data (Hex code)

*1 □□ has a value of 0 ~ 63. This value is the MAC ID of the server.

4.22.3 Length of Sending Common Service Data <BFM #1□□33*1> (Read/Write)

These buffer memories are used for setting length of sending common service data to the server. Default value is K0.

*1 □□ has a value of 0 ~ 63. This value is the MAC ID of the server.

4.22.4 Length of Receiving Data <BFM #1□□34*1> (Read Only)

These buffer memories are used for checking the length of data received from the server.
This value is given in number of bytes received.

*1 □□ has a value of 0 ~ 63. This value is the MAC ID of the server.

4.22.5 Group Selection <BFM #1□□35*1> (Read/Write)

These buffer memories are used for setting the connection group.
The default value is K3.

Table 4.17: Group Setting <BFM #1□□35*1>

Setting Value	Reading Value	Description
0	Not used	
1	0	Group 1
2	Not used	
3	3	Group 3
4 or more	Not used	

*1 □□ has a value of 0 ~ 63. This value is the MAC ID of the server.

4.22.6 Class ID and Instance ID <BFM #1□□36*1>

These buffer memories are used for setting the Class ID and the Instance ID.
For Class ID and Instance ID, refer to Appendix B.

Figure 4.5: Class ID and Instance ID <BFM #1□□36*1>

	Upper byte	Lower byte
BFM #1□□36	Class ID (Hex code)	Instance ID (Hex code)

*1 □□ has a value of 0 ~ 63. This value is the MAC ID of the server.

4.22.7 Attribute ID and Service Code <BFM #1□□37*1>

These buffer memories are used for setting the Class ID and the Instance ID.
For Class ID and Instance ID, refer to Appendix B.

Figure 4.6: Attribute ID and Service Code <BFM #1□□37*1>

	Upper byte	Lower byte
BFM #1□□37	Attribute ID (Hex code)	Service Code (Hex code)

*1 □□ has a value of 0 ~ 63. This value is the MAC ID of the server.

4.23 UCMM Server Communication Data Area <BFM #20000 ~ #26336>

This area is used for the UCMM connection when 64DNET is a server.

4.23.1 Send/Receive Data Area <BFM #2□□00*1 ~ #2□□31*1> (Read/Write)

These buffer memories are used to send/receive data to/from the client. The buffer memory for send/receive data is allocated as in table 4.18.

Note:

- The send data and receive data buffers have the same buffer memory addresses (BFM #2□□00*1 ~ #2□□31*) for use with FROM and TO instructions. This means it is not possible to check the buffer memory data using a FROM instruction because this instruction only reads receive buffer data.
- Buffer Memories (BFM #2□□00*1 ~ #2□□31*) are only refreshed for the number of bytes decided by BFM #2□□32.
  Therefore, when less data is received from the master compared to the previous time, some data remains from the prior message.

*1 □□ has a value of 0 ~ 63. This value is the MAC ID of the client.

Table 4.18: Send data/Receive Data Area <BFM #2□□00*1 ~ #2□□31*1>

BFM No.	Description			
	Send Data (using TO Instruction)		Receive Data (using FROM Instruction)	
	Upper Byte	Lower Byte	Upper Byte	Lower Byte
BFM #2□□00*1	2nd byte	1st byte	2nd byte	1st byte
BFM #2□□01*1	4th byte	3rd byte	4th byte	3rd byte
BFM #2□□02*1	6th byte	5th byte	6th byte	5th byte
⋮	⋮		⋮	
BFM #2□□31*1	64th byte	63th byte	64th byte	63th byte

*1 □□ has a value of 0 ~ 63. This value is the MAC ID of the client.

4.23.2 Length of Assembly Data <BFM #2□□32*1> (Read/Write)

These buffer memories are used for setting the length of assembly data from the client. The 64DNET can exchange maximum 64 bytes to the client. Default value is H0404 (Hex code). The setting range of the upper and lower bytes is H01 to H40.

Figure 4.7: Length of Assembly Data <BFM #2□□32*1>

	Upper byte	Lower byte
BFM #2□□32	Not Used (Must be 00 hex.)	Receive data (Hex code)

*1 □□ has a value of 0 ~ 63. This value is the MAC ID of the client.

4.23.3 Length of Sending Common Service Data <BFM #2□□33*1> (Read/Write)

These buffer memories are used for setting the length of the sending common service data to the server. The default value is K0.

*1 □□ has a value of 0 ~ 63. This value is the MAC ID of the client

4.23.4 Length of Receiving Data <BFM #2□□34*1> (Read Only)

These buffer memories are used for checking the length of the data received from the client. This value is given in number of bytes received.

*1 □□ has a value of 0 ~ 63. This value is the MAC ID of the server.

4.23.5 Group Select <BFM #2□□35*1> (Read Only)

These buffer memories are used for checking the connection group.
The default value is K3.

Table 4.19: Group Setting <BFM #2□□35*1>

Value	Description
0	Group 1
1, 2	Not used
3	Group 3
4 or more	Not used

*1 □□ has a value of 0 ~ 63. This value is the MAC ID of the server.

4.23.6 Class ID and Instance ID <BFM #2□□36*1> (Read only)

These buffer memories are used for checking the Class ID and the Instance ID.
For Class ID and Instance ID, refer to Appendix B.

Figure 4.8: Class ID and Instance ID <BFM #2□□36*1>

	Upper byte	Lower byte
BFM #2□□36	Class ID (Hex code)	Instance ID (Hex code)

*1 □□has a value of 0 ~ 63. This value is the MAC ID of the server.

4.23.7 Attribute ID and Service Code <BFM #2□□37*1> (Read only)

These buffer memories are used for checking the Attribute ID and the Service Code.
For the Attribute ID and the Service Code, refer to Appendix B.

Figure 4.9: Attribute ID and Service Code <BFM #2□□37*1>

	Upper byte	Lower byte
BFM #2□□37	Attribute ID (Hex code)	Service Code (Hex code)

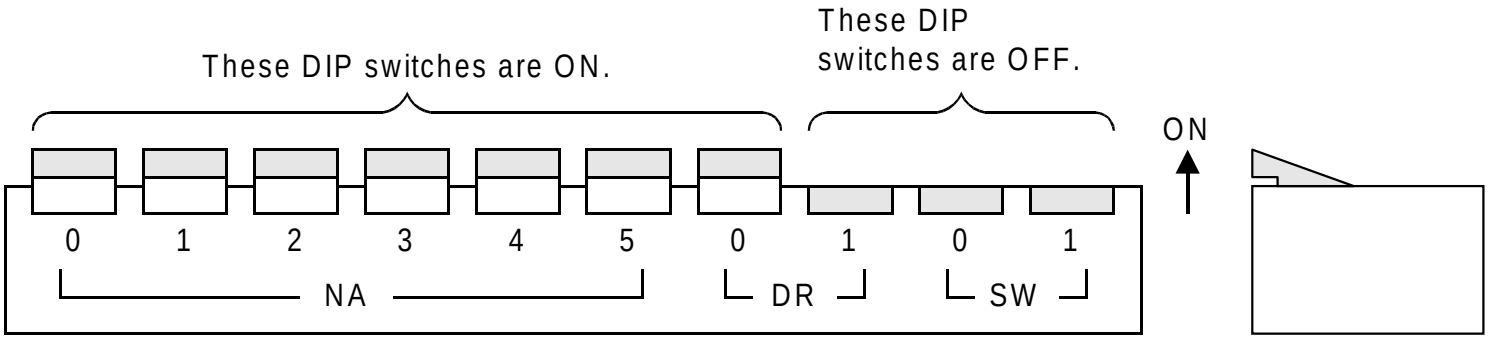
*1 □□has a value of 0 ~ 63. This value is the MAC ID of the server.

MEMO

5. DIP Switch Setting

5.1 Setting DIP Switch

Figure 5.1: Allocation DIP Switch



5.1.1 Mode Setting (DIP Switch: SW0, SW1)

Operation mode is decided by the DIP switches SW0 and SW1.

Default setting: Normal operation mode (SW0 =OFF, SW1 = OFF)

Table 5.1: Mode Setting (DIP Switches: SW0, SW1)

SW1	SW0	Using Mode
OFF	OFF	Normal operation
OFF	ON	Not used
ON	OFF	
ON	ON	

5.1.2 Baud Rate Setting (DIP Switch: DR0, DR1)

Operation mode is decided by the DIP switches DR0 and DR1.

Default setting: 500 kbps (DR0 = OFF, DR1 = ON)

Table 5.2: Baud Rate Setting (DIP Switches: DR0, DR1)

DR1	DR0	Setting Baud Rate
OFF	OFF	125 kbps
OFF	ON	250 kbps
ON	OFF	500 kbps
ON	ON	Not used

5.1.3 MAC ID Setting (DIP Switches: NA0 ~ NA5)

The MAC ID is decided by the sum total value of the DIP switches NA0 ~ NA5. The MAC ID setting value range is 0 ~ 63. Default setting: 63 (NA0 ~ NA5 are all ON)

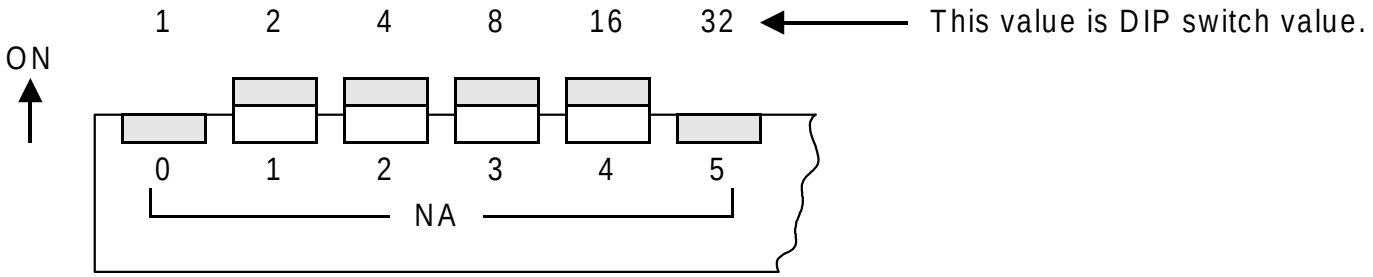
Table 5.3: DIP Switch Value

DIP Switch	Value	
	ON	OFF
NA0	1	0
NA1	2	
NA2	4	
NA3	8	
NA4	16	
NA5	32	

Example Setting

If the MAC ID of the 64 DNET is set to “30”, the DIP switches are as shown below.

Figure 5.2: Example Setting of MAC ID



MEMO

6. Client/Sever Communication by UCMM Connection

6.1 Information of UCMM Connection by 64DNET

The UCMM connection is client/server communication. The direction of connection is client to server. The 64DNET can become one client of maximum of 63 nodes and the server of maximum 63 nodes. Moreover, it is possible to connect to the same node by the connection of the client and the server.
For supported objects, refer to Appendix B.

Note: Supported UCMM Connection by 64DNET

When the 64DNET is a client, it can send data or request data from the server. If the 64DNET sends a data request to the server, it will receive data from the server. When the 64DNET is the server, it can receive and request data from client. If the 64DNET receives a request from a client, it will send an answer data to the client.

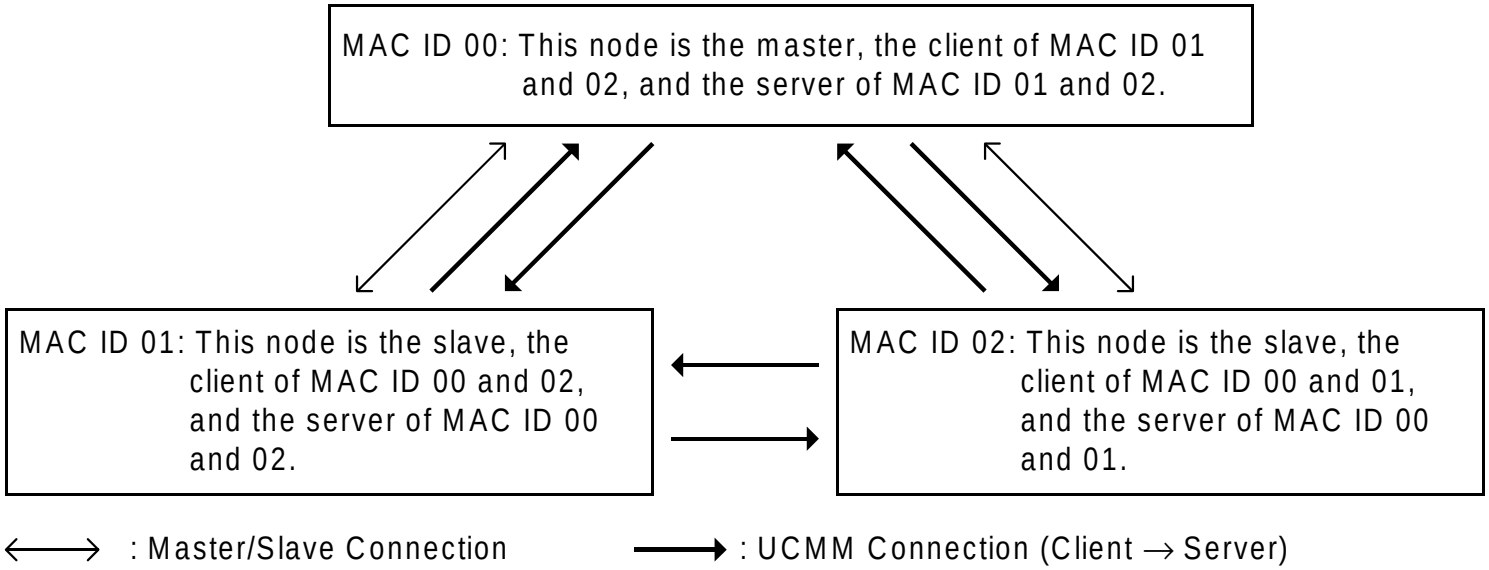
Table 6.1: UCMM Connection Flags and Status

Flags	Client	Server
Connection status	✓	
Sending trigger flag	✓	
Receiving status	✓	✓
UCMM client WDT switch	✓	
Communication status	✓	✓

6.2 How to Use Peer to Peer Communication

When using the peer to peer communication, the connection for each node is shown below.

Figure 6.1: Peer to Peer Communication


MAC ID 00: This node is the master, the client of MAC ID 01 and 02, and the server of MAC ID 01 and 02.
MAC ID 01: This node is the slave, the client of MAC ID 00 and 02, and the server of MAC ID 00 and 02.
MAC ID 02: This node is the slave, the client of MAC ID 00 and 01, and the server of MAC ID 00 and 01.
: Master/Slave Connection
: UCMM Connection (Client → Server)

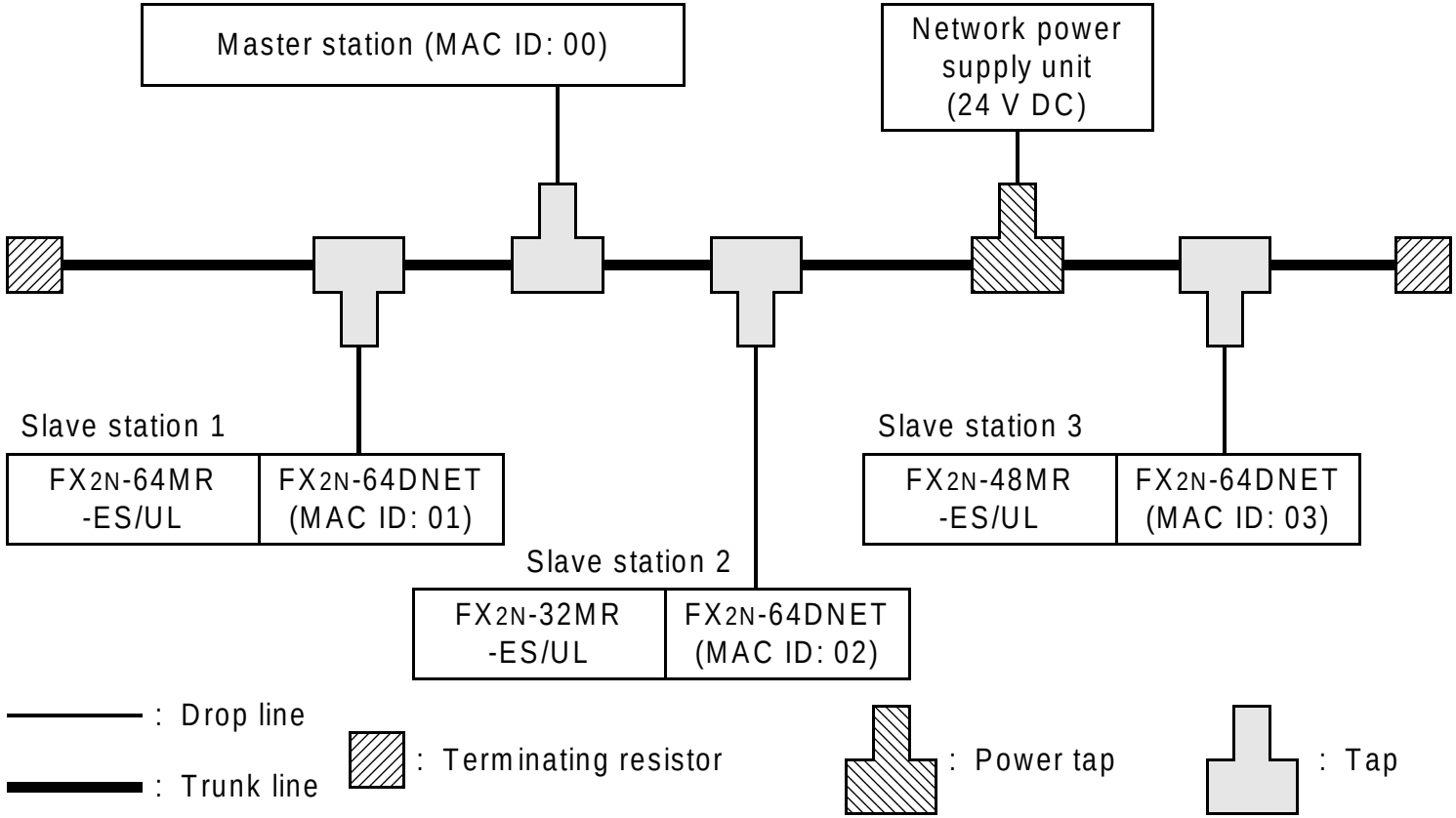
Note:

- Each node must support the UCMM connection and know the object information (Class ID, Instance ID, Attribute ID and service code) about all nodes.
  For the object information of 64DNET, refer to Appendix B.
- When using UCMM connection, please choose group 3.

7. Example Program

7.1 System Configuration

Figure 7.1: System Configuration for Example Program



7.2 Operation

This operation is written for Slave Station 1.

1) Master/Slave I/O connection:
   - Slave station 1 exchanges 64/64 bytes data to the master station (MAC ID 00) by the Master/Slave I/O connection.
   - Received data from the master station is stored in D150 ~ D181 in slave station 1.
   - D100 ~ D131 in slave station 1 are sent to the master station.
2) The UCMM connection when slave station 1 (MAC ID 01) is the client:
   - Slave station 1 exchange 64/64 bytes data to slave station 2 (server, MAC ID 02) by the UCMM connection.
   - Received data from the server is stored in D500 ~ D531 in slave station 1.
   - When X000 is turned ON, slave station 1 connects to slave station 2 by the UCMM connection.
3) The UCMM connection when the slave station 1 (MAC ID 01) is the server:
   - The slave station 1 can receive 64 bytes data from slave station 3 (client, MAC ID 03) by the UCMM connection.
   - Data received data from slave station 3 is stored in D600 ~ D631 in slave station 1.

7.3 Example Program

This example program is written about slave station 1.

Note:

When many FROM/TO instructions are executed in the same scan, the PLC might have a watchdog timer error. In this case, add a watchdog timer reset (FNC07 WDT) instruction with each FROM/TO instruction that sends and receives data.

7.3.1 Initial Setting

Figure 7.2: Initial Setting

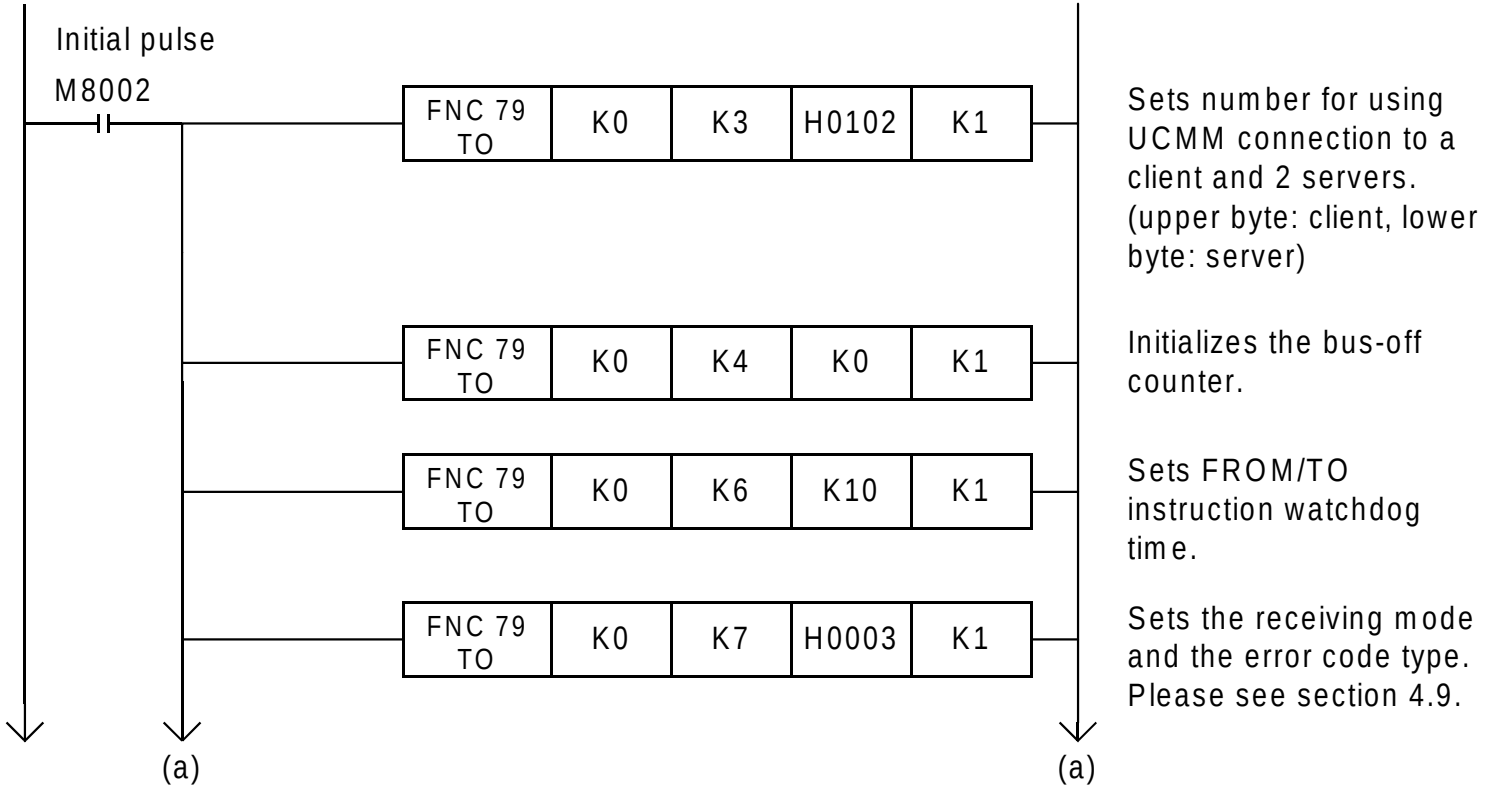
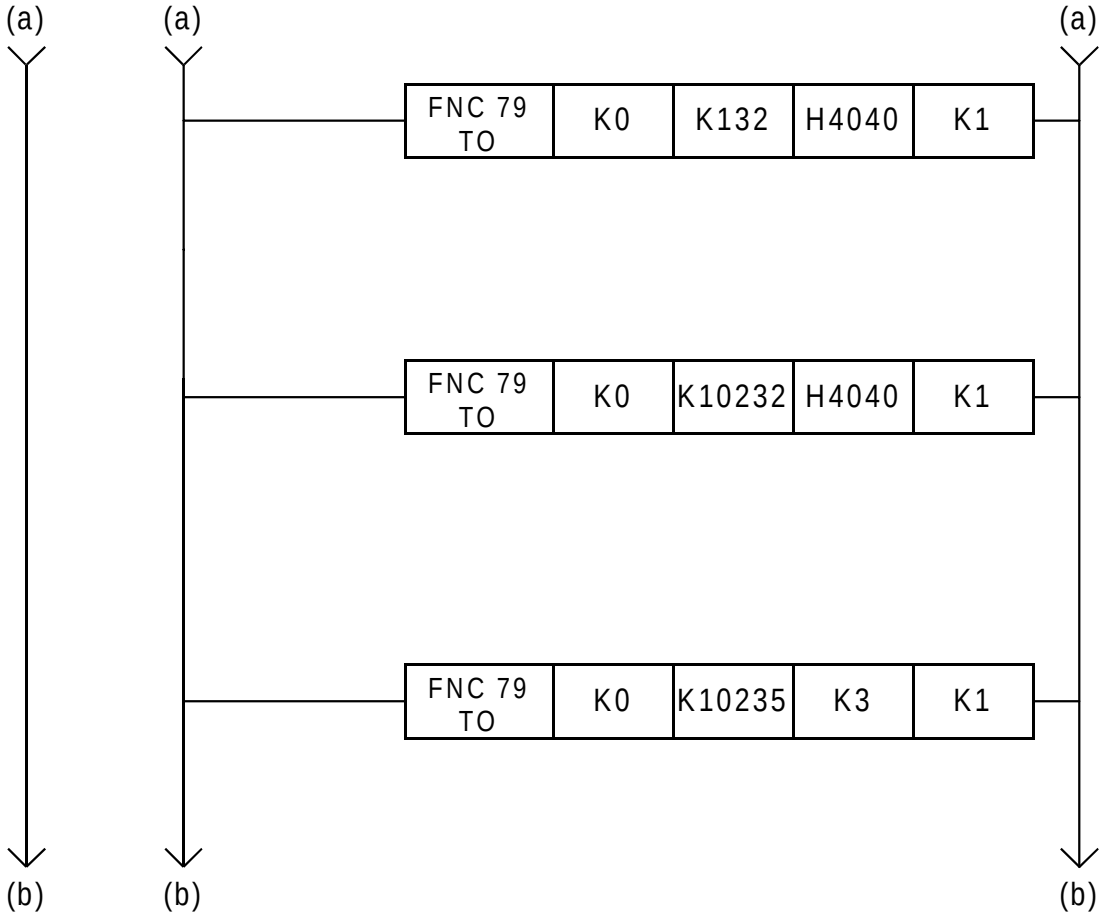


Figure 7.2: Initial Setting

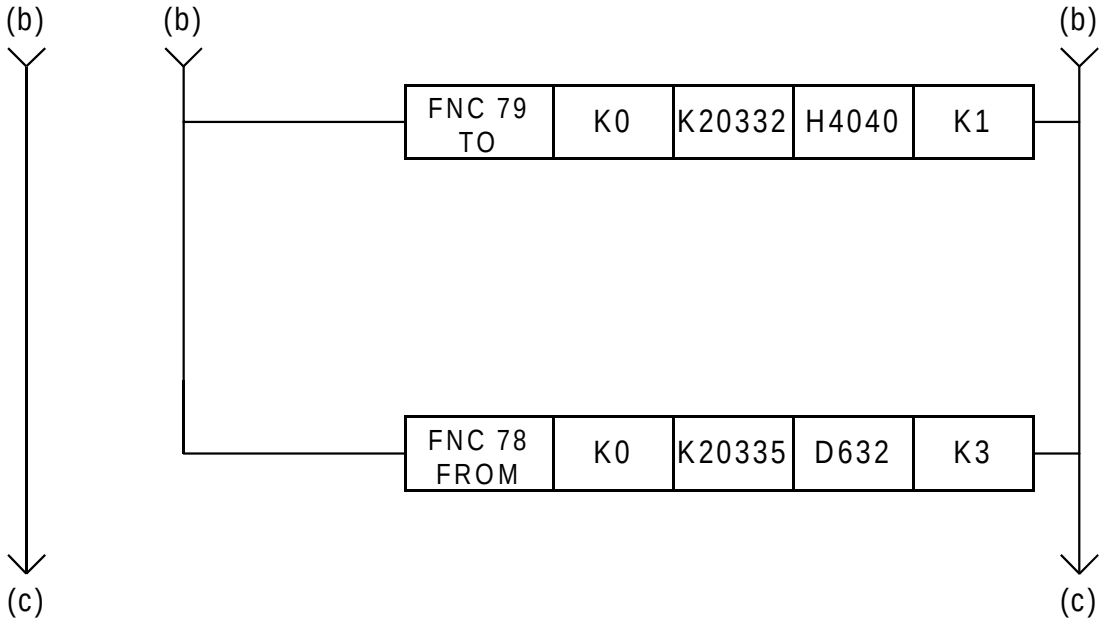


Sets number of link points for Master/Slave I/O connection to 64 /64 bytes (upper byte: sending data, lower byte: receiving data).

Sets number of link points for UCMM connection of server (MAC ID: 02) to 64 /64 bytes (upper byte: sending data, lower byte: receiving data).

Sets selection group to group 3 for this server (MAC ID: 02).

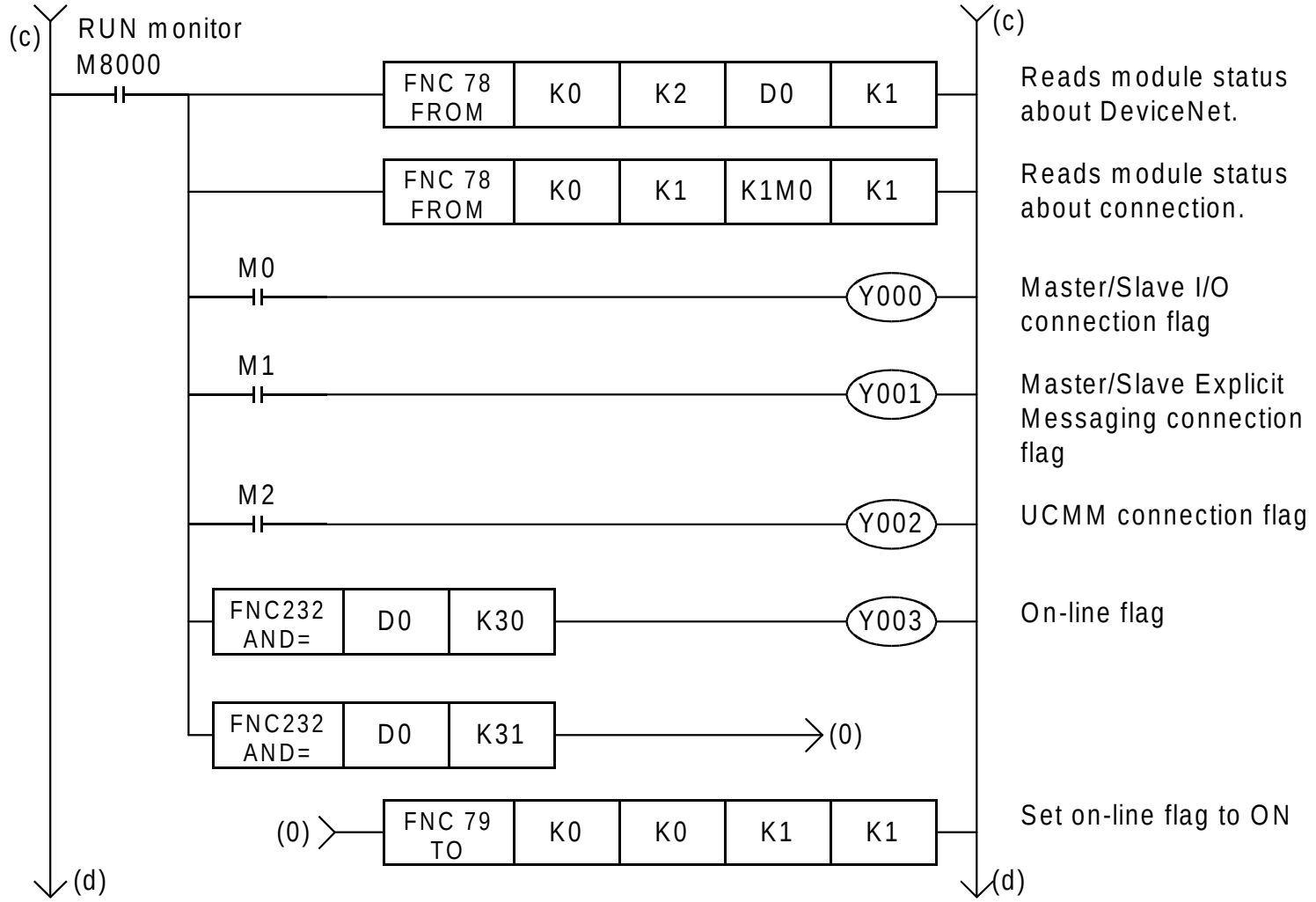
Figure 7.2: Initial Setting



Sets number of link points for UCMM connection of client (MAC ID: 03) to 64 /64 bytes (upper byte: sending data, lower byte: receiving data).

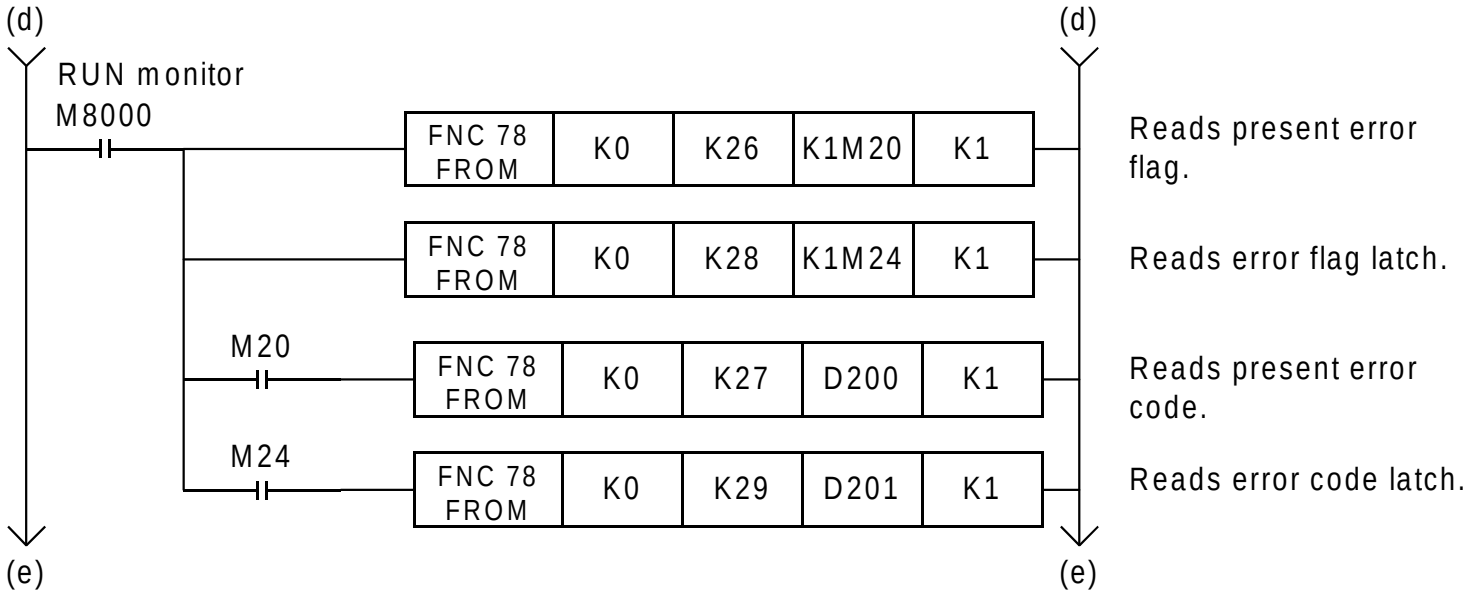
Reads Selection Group, Class ID, Instance ID, Attribute ID, and Service code for client (MAC ID: 03).

Figure 7.2: Initial Setting



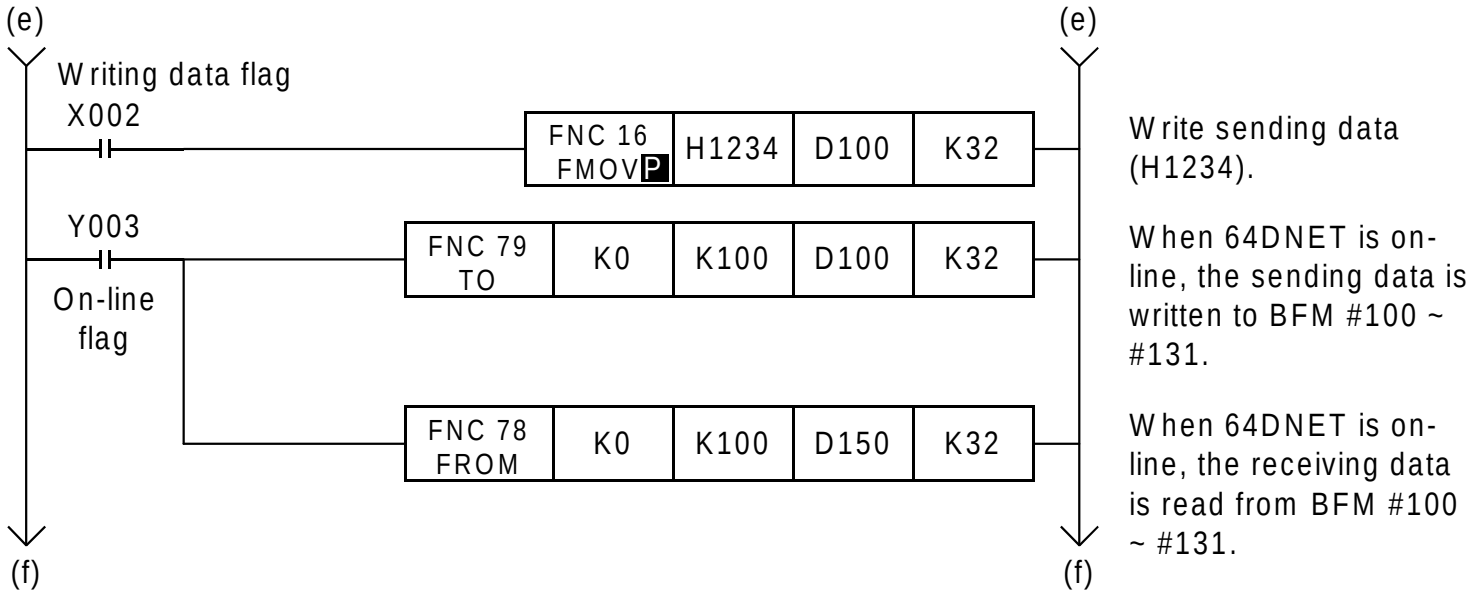
7.3.2 Checking Error Status

Figure 7.3: Checking Error Status



7.3.3 Input Data and Output Data for Master/Slave I/O Connection

Figure 7.4: Input Data and Output Data for Master/Slave I/O Connection



7.3.4 Input Data and Output Data for UCMM Connection

1) Using client

Figure 7.5: UCMM Connection (Client)

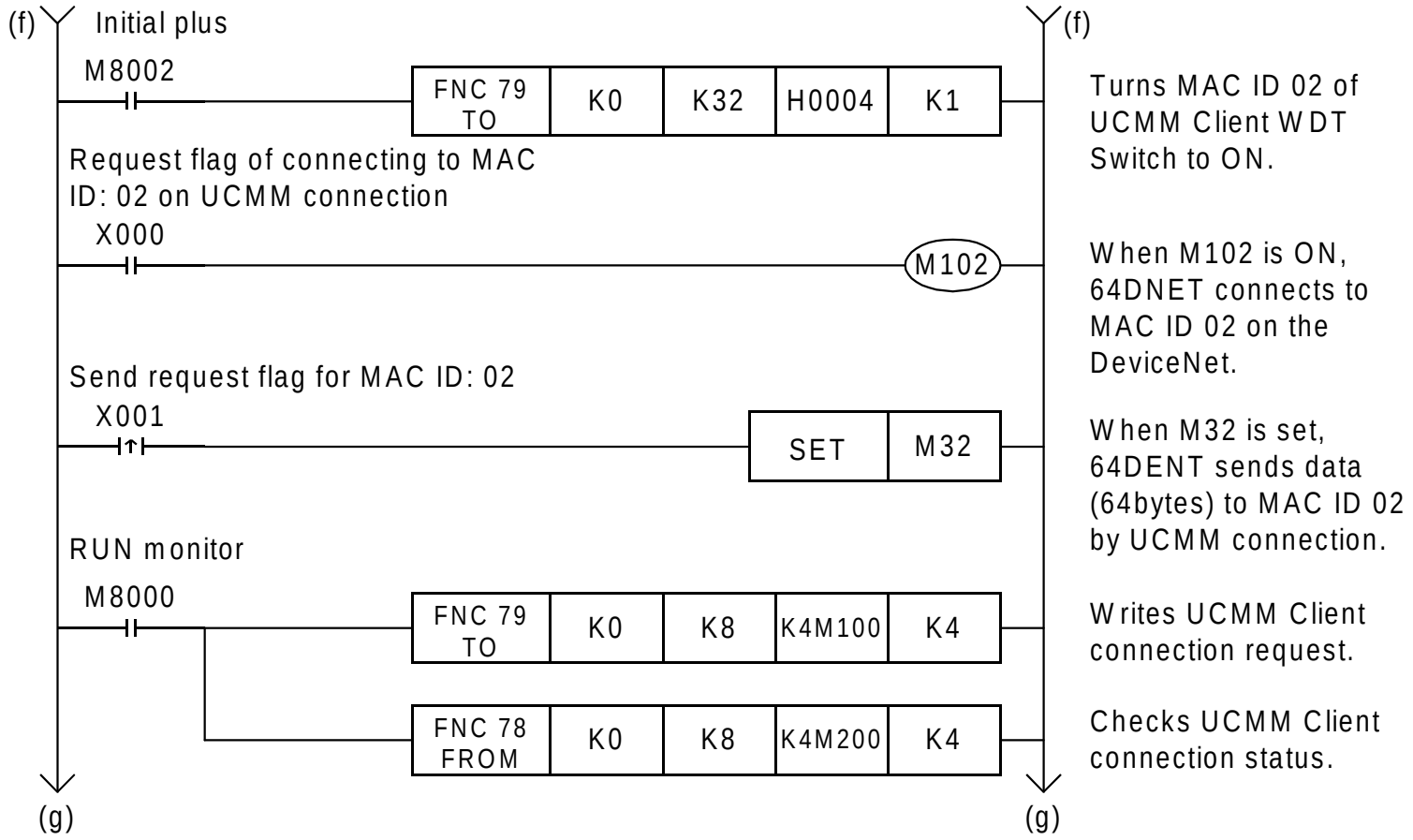


Figure 7.5: UCMM Connection (Client)

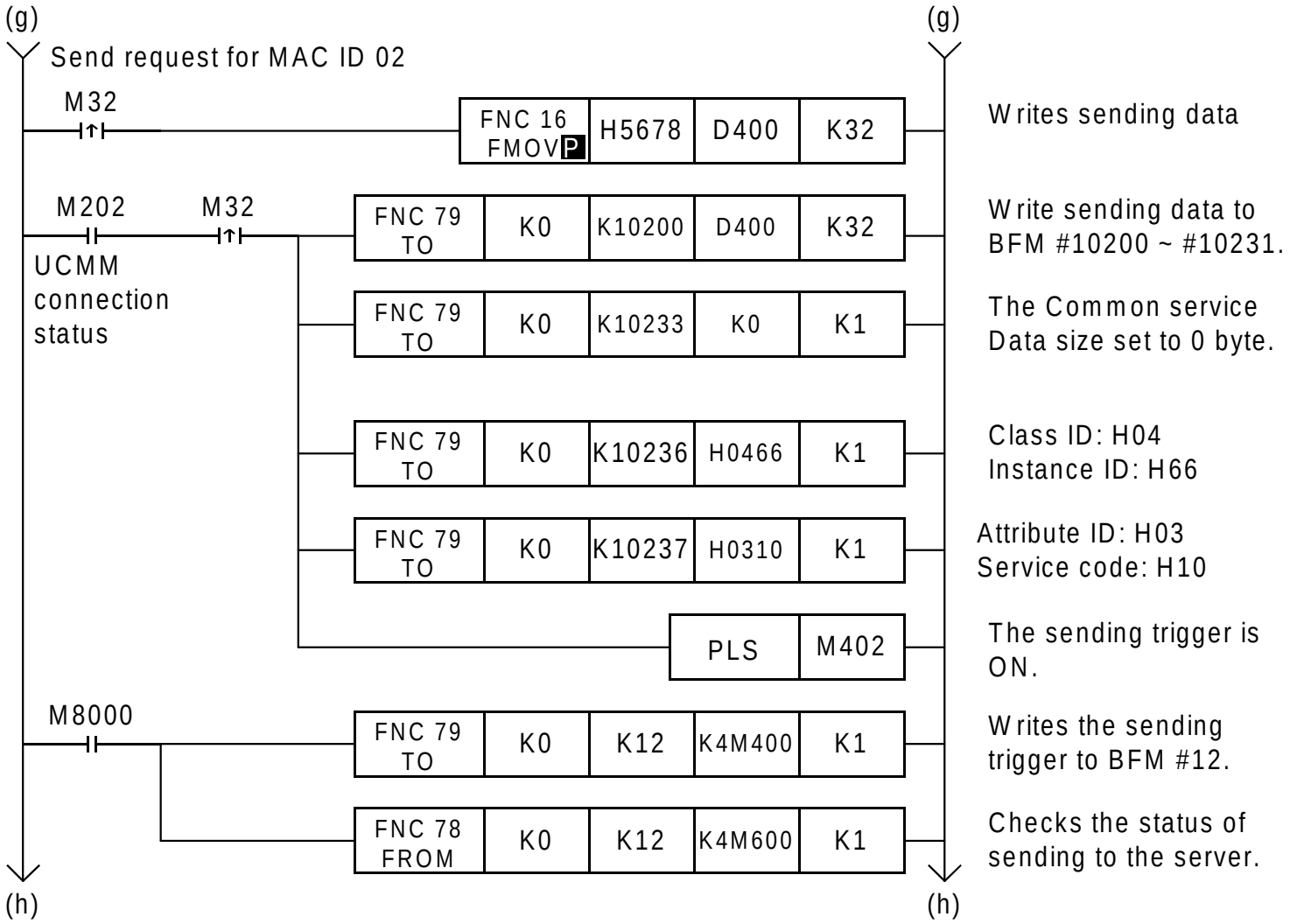
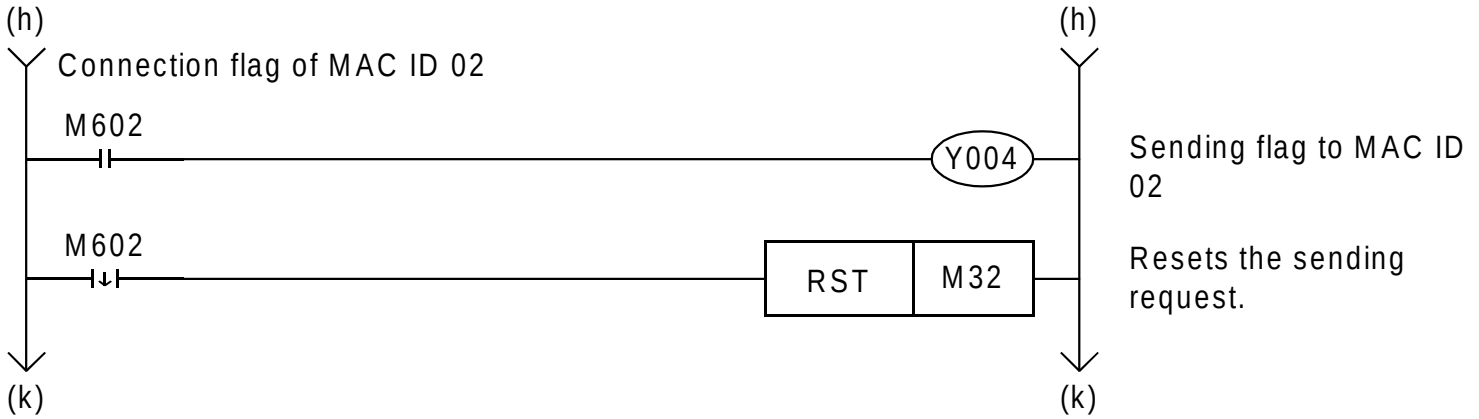


Figure 7.5: UCMM Connection (Client)



2) Using server

Figure 7.5: UCMM Connection (Client)

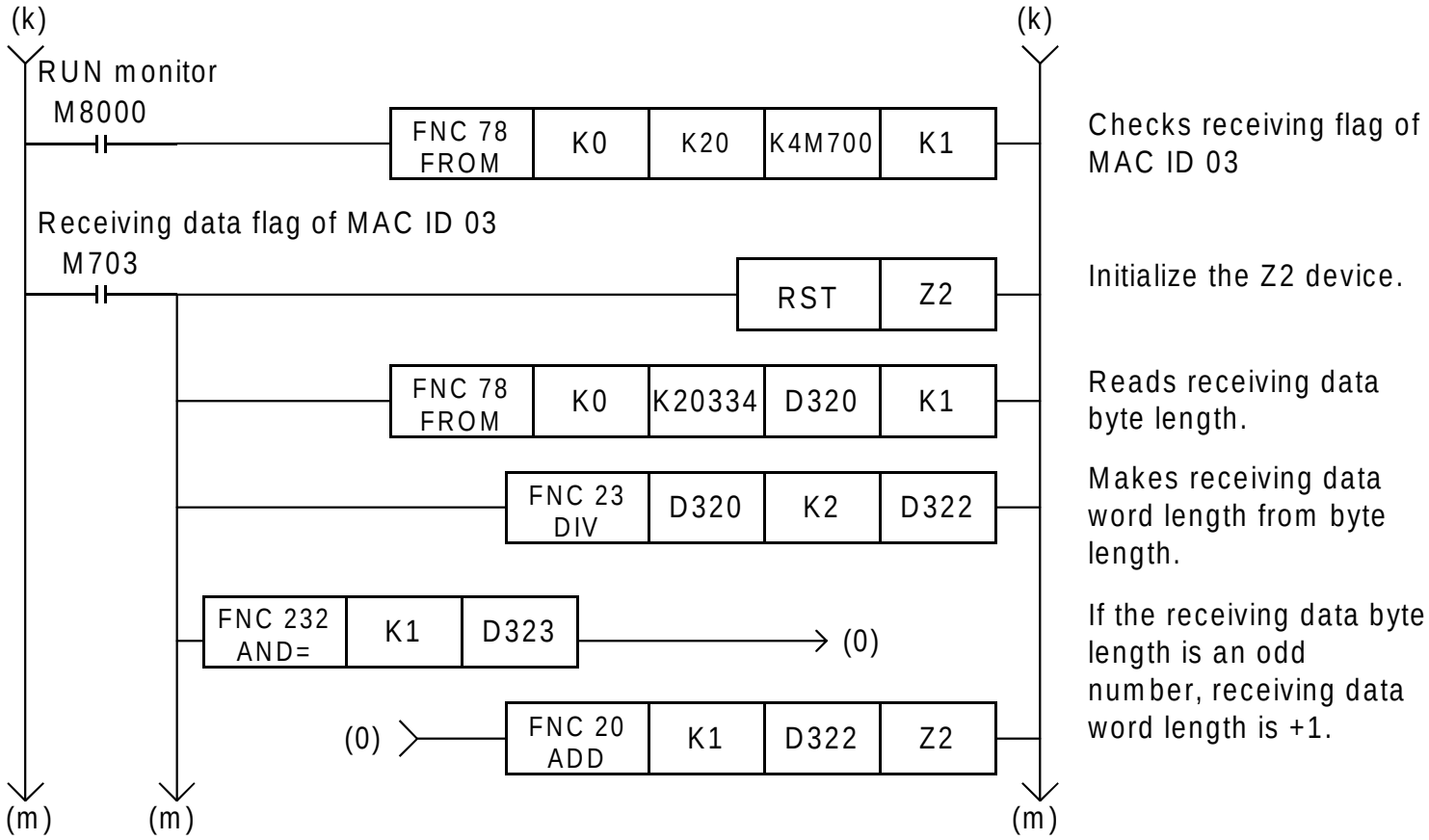
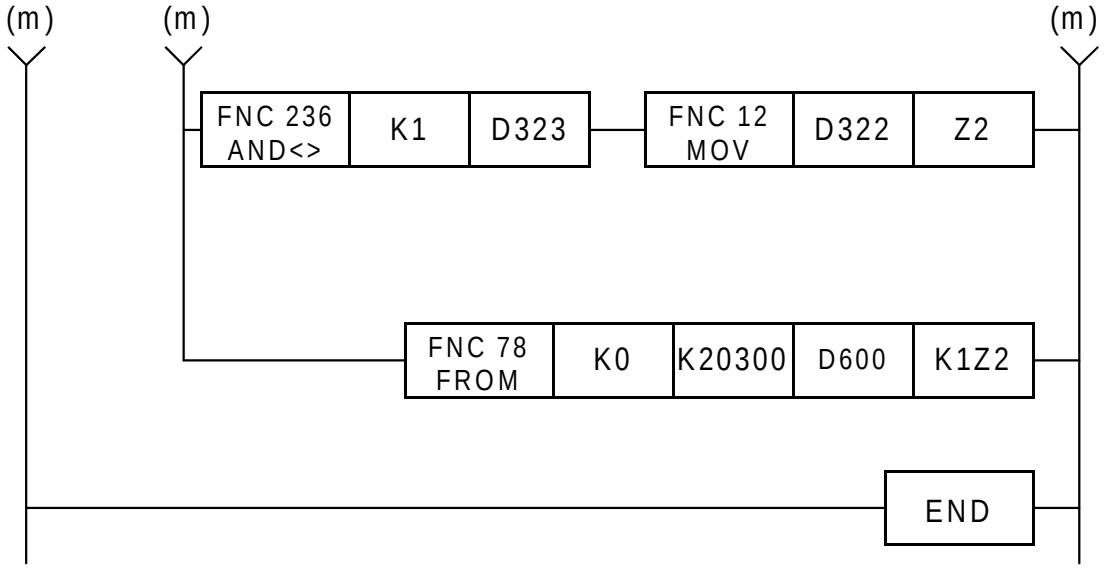


Figure 7.6: UCMM Connection (Server)



If the receiving data byte length is an even number, receiving data word length is the same as byte length.

Reads the receiving data from BFM #20300 ~ #20331 area.

8. Diagnostics

8.1 Preliminary Checks

1) Check “POWER LED”.
   If “POWER LED” is OFF, check the connection of the 64DNET extension cable to PLC, and check whether the 5V DC voltage source capacity is sufficient.

2) Check “MS LED” and “NS LED”.
   If both LEDs are not lit green, check the wiring for the DeviceNet, the module status in BFM #2, the setting of the Master and the error code in BFM #27, #29.
   For module status, refer to section 4.4. For error code, subsection 7.2.2. For wiring, refer to chapter 2 and manual of the Master. For the setting of the Master, refer to manual of the Master.

3) Check whether 24 V DC voltage source capacity of DeviceNet suffices.
   Supply current and voltage.

4) Check baud rate.
   If the baud rate set in 64DENT is not the same as other station, change to matching values. When changing the setting value in 64DNET, please turn the power supply of the PLC OFF to ON.
   For the baud rate of 64DNET, see BFM #48 in 64DNET.

5) Check the MAC ID of 64DNET.
   Please do not use the same MAC ID for more than one node on the DeviceNet.

8.2 LED Check

Check the status of the LED's for the 64DNET as follows.

1) POWER LED check

Table 8.1: POWER LED Check

Status	Description
Lit	The extension cable is properly connected. And 5 V DC is properly supplied from PLC.
Otherwise	Check the connection of the 64DNET extension cable to the PLC, and check whether the 5V DC voltage source capacity of PLC suffices.

2) FROM/TO LED check

Table 8.2: FROM/TO Check

Status	Description
Lit.	BFM is accessed by FROM/TO instruction.
Otherwise	BFM is not accessed by FROM/TO instruction.

3) MS LED check

Table 8.3: MS LED (Module Status LED) Check

MS LED Status	64DNET Status	Description
Not lit	Power OFF	Check whether 24 V DC voltage source has sufficient ampere capacity. Provide sufficient current.
Lit Green	Normal Operation	The 64DNET is in normal operation mode.
Flashing Green at 0.5 s intervals	Stand-by	The 64DNET is in stand-by status.
Flashing Red at 0.5 s intervals	Minor Fault	A recoverable error has occurred.
Lit Red	Unrecoverable Fault	An unrecoverable error has occurred. Please contact a service representative.
Flashing Green and Red at 0.5 s intervals	Self Test	The 64DNET is in self test mode.

4) NS LED

Table 8.4: NS LED (Network Status LED) Check

MS LED Status	64DNET Status	Description
Not lit	Not On-line	The 64DNET is not on-line. • The power supply voltage is incorrect for DeviceNet. • When the value in BFM #0 is K0, 64DNET is off-line. In this case, write K1 to BFM #0. At this time, 64DNET will be on-line.
Lit Green	Link OK	The 64DNET is on-line and has established the connection.
Flashing Green at 0.5 s intervals	On-line Status Without Connection	The 64DNET is on-line but has not the established the connection. Check the setting of the Master, and check setting of the UCMM connection in 64DNET.
Flashing Red at 0.5 s intervals	Communication Time-out	The 64DNET I/O connection is in time-out status. Check the setting of the Master.
Lit Red	Critical link Failure	Communication is not possible. Check wiring, and check the MAC ID of 64DNET to be used by other node. If the same, change the MAC ID of 64DNET or other node.
Flashing Green and Red at 0.25 s intervals	Communication Fault	The 64DNET is in the Communication Faulted status for detecting the Network Accessing Error. After this module will receive the Identify Communication Faulted Request. Check error code. For error code, refer to subsection 7.2.2.

8.3 Error Code

Error code of 64DNET is 64DNET error code and DeviceNet error code.

Note:

If error code is for the UCMM connection, please check the UCMM client connection status (BFM #36 ~ #39), UCMM client communication status (BFM #40 ~ #43) and UCMM server communication status (BFM #44 ~ #47). The source of the error must be checked in the individual device buffer memories.

8.3.1 64DNET Error Code (BFM #7 Bit 1 is ON)

This error code is service type (upper byte) and detailed error code (lower byte).

Table 8.5: 64DNET Error Code

Service Type (Upper Byte)	Detailed error code (Lower Byte)	Description	Check Points
01	Critical fault connection time-out		
	01	The first occurrence of a duplicate MAC ID was received.	Change setting the MAC ID of the DIP switch with other devices in the network so as not to repeat previously used numbers.
	02	The second occurrence of duplicate MAC ID was received.	
	03	DR1 and DR2 of DIP switch are set to 1 (This setting is the “Not used” position).	Set the baud rate correctly.

Table 8.5: 64DNET Error Code

Service Type (Upper Byte)	Detailed error code (Lower Byte)	Description	Check Points
01	04	The receive buffer for the CAN interrupt overflowed.	Reduce the number of data of sending and receiving, reduce the communication frequency or lower the baud rate.
	05	CAN Controller is in the bus-off state.	Check system configuration on the DeviceNet.
	06	The Explicit message connection time-out occurred.	Allocate the Explicit Message Connection from the Master or the client again.
	11	Duplicate MAC ID response message was received.	Change setting the MAC ID of the DIP switch with other devices in the network so as not to repeat previously used numbers.
	12	Duplicate MAC ID request was received, the MAC ID is in transmission time-out waiting status.	
	13	The Polling connection time-out occurred.	Allocate the Master/Slave I/O Connection from the Master again.
	14	The COS/Cyclic connection time-out occurred.	

Table 8.5: 64DNET Error Code

Service Type (Upper Byte)	Detailed error code (Lower Byte)	Description	Check Points
02	Allocate_Master/Slave_Connection_Set service error (An error with the connection the Allocate request)		
	02	The Allocate request was received from a different Master.	Check the settings of the Master
	06	64DNET cannot support connections other than the Explicit message, Polling, and COS/Cyclic in the Allocate request.	
	07	The Allocate request bit is not properly set.	Check the setting of the Master to order the Allocate request.
	08	The specified connection has already been allocated.	Allocate only once for each connection.
	09	The Reserve Bit of allocator MAC ID does not turn OFF.	Check packet data for the Allocate request from the Master.
	10	Allocation Choice Bit is not specified.	Check the setting of Master to order the Allocate request.

Table 8.5: 64DNET Error Code

Service Type (Upper Byte)	Detailed error code (Lower Byte)	Description	Check Points
02	11	The Ack Suppress Bit is specified but the COS/Cyclic bit is not specified.	Check the setting of Master to order the Allocate request.
	12	Tries to establish both COS and Cyclic transmission method for Master/Slave connection.	
	13	The Polling connection cannot be established because the Instance ID has already been used by the COS/Cyclic connection.	
03	Release_Master/Slave_Connection_Set service error (An error with the open connection request)		
	06	64DNET cannot support connections other than the Explicit message, Polling, and COS/Cyclic in the Allocate request.	Connections other than the Explicit message, Polling, and COS/Cyclic are not supported.
	07	The connection for the Release request is done is not specified.	Specify the connection for the Release request.
	08	The specified connection has already been released.	Use only one Release request per connection.

Table 8.5: 64DNET Error Code

Service Type (Upper Byte)	Detailed error code (Lower Byte)	Description	Check Points
04	Get_Attribute_Single service error (An error with the read request of the Master)		
	03	An invalid value for the Instance ID and the Attribute ID of the Get service command was specified.	Check the packet data of the Get service request from the Master and correctly specify the Attribute ID value.
05	Set_Attribute_Single error (An error with the write request of the Master)		
	02	The Set service is not supported by the specified Attribute ID.	Do not use the Set service request with the specified Attribute ID.
	03	The Attribute ID is outside the range.	Correctly specify the Attribute ID.
	04	The attribute value written in the Set service is outside the range.	
06	Reset service error (An error with the reset request of the Master)		
	01	The state of the connection is contradicted.	Do not reset except when in time-out.
	02	The parameter of the Reset service is outside the range.	Correctly specify parameter.

Table 8.5: 64DNET Error Code

Service Type (Upper Byte)	Detailed error code (Lower Byte)	Description	Check Points
07	I/O Polling request receive error		
	01	Middle or final packet was received before the first packet data.	Check the parameter settings of the Master with regard to the Master/Slave I/O communication, and status of the DeviceNet.
	02	Sequence error for receiving the I/O data.	
	03	Receives more data than the maximum number of I/O byte data.	
08	Explicit message reception error		
	01	The message fragment send and receive are operating concurrently.	Check the system configuration on the DeviceNet.
	02	Middle or final packet was received before the first packet data.	Check the parameter setting of the Master and the system configuration on the DeviceNet.
	03	The same message fragment was received twice rather than receiving the complete message.	

Table 8.5: 64DNET Error Code

Service Type (Upper Byte)	Detailed error code (Lower Byte)	Description	Check Points
08	04	Sequence error for receiving a message fragment.	Check the parameter setting of the Master and the system configuration on the DeviceNet.
	05	Receives message larger than maximum number of message bytes allowed.	
	06	A message is received before the send message has finished transmission.	Check the system configuration on the DeviceNet.
A1	DeviceNet object error		
	01	An invalid service request for the DeviceNet Object Class was received.	Check the packet data for the Get service request from the Master or other node.
	02	An invalid request for the DeviceNet Object Instance was received.	
	03	Instance ID which does not exist in the DeviceNet Object Instance was specified.	
	05	An invalid Class ID for the DeviceNet Object Instance was specified.	

Table 8.5: 64DNET Error Code

Service Type (Upper Byte)	Detailed error code (Lower Byte)	Description	Check Points
A2	Connection object error		
	01	The Connection Object Class was accessed.	Check the packet data for the Get service request from the Master.
	02	An invalid Service request for the Connection Object Instance was received.	
	03	Instance ID which does not exist in the Connection Object Instance was specified.	
	04	An invalid Attribute ID for the Connection Object Class was specified.	
A3	Identity (ID) object error		
	01	The Object Class ID was accessed.	Check the packet data for the Get service request from the Master.
	02	An invalid Service request for the Object Instance ID was received.	
	03	A value which does not exist in the Object Instance ID was specified.	

Table 8.5: 64DNET Error Code

Service Type (Upper Byte)	Detailed error code (Lower Byte)	Description	Check Points
A5	Assembly object error		
	01	The Assembly Object Class was accessed.	Check the packet data for the Get service request from the Master.
	02	A value which does not exist in the Assembly Object Instance ID was specified.	
A6	Grup2 Only UCMM message error		
	03	The value which does not support to the Class ID or the Instance ID for the UCMM message is used.	Check the packet data for the Get service request from the Master.
B0	Peer-to-peer message error		
	01	The Service code received through the UCMM connection is not supported.	Check the client setting for the UCMM connection with regard to the Service code.
	02	The specified Selection Group for the UCMM connection from client is not supported.	Check the client setting for the UCMM connection with regard to the Selection Group.
	03	The specified value of the Selection Group in the client is invalid.	

Table 8.5: 64DNET Error Code

Service Type (Upper Byte)	Detailed error code (Lower Byte)	Description	Check Points
B0	04	The 64DNET is already connected to the number of devices specified in BFM #3.	Check the setting value in the BFM #3. The 64DNET cannot be connected to more devices than the number in BFM #3.
	06	The message ID received by the Open_Explicit_Messaging Connection Request is invalid in the specified message group.	Check the setting of the client with regard to the Source Message ID.
	07	The message ID received by the Open_Explicit_Massaging_Connection_Request already is used in the group 1 or group 3.	Check the setting of the client, and configuration of the DeviceNet.
	08	The Instance ID received by the Close_Connection_Request is not supported.	Check the setting of the client about Instance ID.
	09	There is no response for the Open Explicit Messaging Connection.	Check the power supply of the server and the connection.

Table 8.5: 64DNET Error Code

Service Type (Upper Byte)	Detailed error code (Lower Byte)	Description	Check Points
B1	Acknowledge Handler Object service error		
	01	The Acknowledge Handler Object was accessed.	Check the packet data from the Master.
	02	The received Service request does not support on the Acknowledge Handler Object.	
	03	The specified Instance ID is invalided on the Acknowledge Handler Object.	
	04	The specified Attribute ID is not supported in the Acknowledge Handler Object.	

Table 8.5: 64DNET Error Code

Service Type (Upper Byte)	Detailed error code (Lower Byte)	Description	Check Points
B3	BFM error		
	01	The server does not have an empty buffer for receiving data.	Put the server into the state that data from the client can be received.
	02	The UCMM client sending trigger turns ON while data is still being sent to the server.	Check the PLC program with regard to BFM #12 ~ #15. Do not turn UCMM Client Sending Trigger for the same server to ON with data sent to the server.
	03	The 64DNET enters the Connection established request to itself.	Check the PLC program with regard to BFM #8 ~ #11.
	04	The 64DNET enters the UCMM client sending trigger to itself.	Check the PLC program with regard to BFM #12 ~ #15.
	05	FROM/TO WDT error	Check the PLC program. The PLC should access the BFMs (one or more) on every scan.

Table 8.5: 64DNET Error Code

Service Type (Upper Byte)	Detailed error code (Lower Byte)	Description	Check Points
B4	Hardware error of 64DNET		
	00	EEPROM error	Check the program of PLC about that accessing BFM of “Not used”, and please contact a service representative.
FF	Others		
	01	The specified service does not support on the UCMM message.	Check the packet data from the Master or the client.
	02	The message router object was accessed.	
	03	The specified Class ID is invalided.	
	04	The network power supply is not supplied.	Check the connection and the network power supply. Supply current and voltage.

8.3.2 DeviceNet Error Code (BFM #7 Bit 1 is OFF)

This error code is general error code (upper byte) and additional error code (lower byte).

Table 8.6: DeviceNet Error Code

General Error Code	Additional Error Code	Description	Check Points
02	Resource unavailable		
	01	The Open Request Group Select is incorrect.	Check the setting of all Masters.
	02	Invalid allocation/release choice parameter.	
	04	A necessary resource for Predefined Master/Slave connection set cannot be used.	
08	Service not supported		
	FF	64DNET does not support this service.	Check the specification of client and server for the UCMM connection, and setting of the Master.
09	Invalid attribute value		
	02	Allocation request is incorrect.	Check the specification of client and server for the UCMM connection, and setting of the Master
	FF	Set_Attribute_Single service error	Check the data for Set_Attribute_Single service.

Table 8.6: DeviceNet Error Code

General Error Code	Additional Error Code	Description	Check Points
13	Not enough data		
	FF	Not enough data	Check the length of send data. The send data is too small.
14	Attribute not supported		
	FF	64DNET does not support this attribute.	Check attribute ID in program for 64DNET and the setting of connected client and server.
15	Too much data		
	FF	Too much data	Check the length of send data. The send data is too large.
16	Object does not exist		
	FF	64DNET does not have this object.	Check object (class ID, instance ID, attribute ID and service code) in program for 64DNET, and the setting of connected client and server.
0B	Reserved by DeviceNet		
	02	Allocate/Release request for Poll, COS and Cyclic is incorrect.	Check the parameter of Master.

Table 8.6: DeviceNet Error Code

General Error Code	Additional Error Code	Description	Check Points
0C	Reserved by DeviceNet		
	01	The MAC ID is incorrect	Check wiring.
	FF	Set_Attribute_Single service error or Rest service error (This object does not support Set_Attribute_Single.)	Check class ID, instance ID, attribute ID and service code in program for 64DNET, and setting of connected client and server
20	Invalid parameter		
	FF	Rest service error	Check wiring, and class ID, instance ID, attribute ID and service code of Master

Appendix A:
EDS (Electric Data Sheet)

The EDS (Electric Data Sheet) of 64DNET shows bellow.

Figure A-1: EDS of 64DNET

```
$ File Description Section
[File]
        DescText    = "FX2N 32 word Input / 32 Word Output Slave Unit";
        CreateDate  = 01-06-2000;
        CreateTime  = 16:14:50;
        ModDate     = 01-06-2000;
        ModTime     = 16:14:50;
        Revision    = 1.0;
```

```
$ Device Description Section
[Device]
        VendCode     = 161;
        VendName     = "Mitsubishi Electric Corporation";
        ProdType     = 12;
        ProdTypeStr  = "Communication Adapter";
        ProdCode     = 3;
        MajRev       = 1;
        MinRev       = 1;
        ProdName     = "FX2N-64DNET";
        Catalog      = "Users' Manual (JY992D86301)";
```

```
$ I/O Characteristics Section
[IO_Info]
        Default       = 0x0001;       $ Bit mapped
                                      $ Bit 0 = Poll
                                      $ Bit 1 = Strobe
                                      $ Bit 2 = Change of State
                                      $ Bit 3 = Cyclic
                                      $ Bit 4-15 = Reserved
        PollInfo      = 0x000D,       $ Combine Cyclic,COS I/O with Poll
                        1,            $ Default Input = Input1
                        1;            $ Default Output = Output1
        COSInfo       = 0x000D,       $ Combine Poll,Cyclic I/O with COS
                        1,            $ Default Input = Input1
                        1;            $ Default Output = Output1
        CyclicInfo    = 0x000D,       $ Combine Poll,COS I/O with Cyclic
                         1,           $ Default Input = Input1
                         1;           $ Default Output = Output1
```

```
Input1          =
                0x04,                   $ Size in Bytes
                0,                      $ All bits significant
                0x000D,                 $ Polled , COS or Cyclic Connection
                "Input Data",           $ Name String
                6,                      $ Path size
                "20 04 24 64 30 03",    $ IO Assy Obj Inst 64 Attr 3
                "";                     $ help string
Output1         =
                0x04,                   $ Size in Bytes
                0,                      $ All bits significant
                0x000D,                 $ Polled ,COS or Cyclic Connection
                "Output Data",          $ Name String
                6,                      $ Path size
                "20 04 24 65 30 03",    $ IO Assy Obj Inst 65 Attr 3
                "";                     $ help string
```

$ Parameter Class Section

$ [ParamClass]

$ Parameter Section

$ [Params]

$ Parameter Enumeration Section

$ [EnumPar]

$ Parameter Groups Section

$ [Groups]

$ End

MEMO

Appendix B:
Class ID, Instance ID, Attribute ID and Service Code

B-1: Identity (0x01)

Class		
	Attribute	Not support
	Service	Not support

Instance (01 Hex)

Attribute	ID	Description	GET	SET	Value
	1	Vendor ID	✓		161
	2	Device type	✓		12
	3	Product code	✓		3
	4	Revision	✓		
		Major revison			1H
		Minor revision			1H
	5	Status	✓		DeviceNet spesifica-tion

Service	DeviceNet service		Parameter option
	0E	Get_Attribute_Single	
	10	Get_Attribute_Signal	
	4B	Reset	
	4C	Get_Attribute_Single	

Vendor-specific additional specifications	

B-2: Message Router (0x02)

Class		
	Attribute	Not support
	Service	Not support

Instance		
	Attribute	Not support
	Service	Not support

Vendor-specific additional specifications	

B-3: DeviceNet (0x03)

Class

Attribute	ID	Description	GET	SET	Value
	1	Revision	✓		02
Service	DeviceNet service		Parameter option		
	0E	Get_Attribute_Single			

Instance

Attribute	ID	Description	GET	SET	Setting Length
	1	MAC ID	✓		0 ~ 63
	2	Device type	✓		0: 125kbps 1: 250kbps 2: 500kbps
	3	Baud rate	✓	✓	0
	4	BOI	✓	✓	0 ~ 255
	5	Bus-off counter	✓		DeviceNet specification
		Alloction information			
		Master's MAC ID			

	Service	DeviceNet service		Parameter option
		0E	Get_Attribute_Single	
		10	Get_Attribute_Signal	
		48	Allocate M/S Connection Set	
		4C	Release M/S Connection Set	

Vendor-specific additional specifications	

B-4: Assembly (0x04)

Class		
	Attribute	Not support
	Service	Not support

Instance (64 Hex: input, 65 Hex output, 66 Hex: UCMM server, 67 Hex: UCMM client)					
Attribute	ID	Description	GET	SET	Value
	3	data	✓	✓	
Service	DeviceNet service		Parameter option		
	0E	Get_Attribute_Single			
	10	Set_Attribute_Signal			

Vendor-specific additional specifications	

B-5: Connection (0x05)

Class		
	Attribute	Not support
	Service	Not support
	Maximum active connection	128

Instance (01 Hex, 0A ~ 49 Hex, 64 ~ A3 Hex, 67 Hex: Explicit Message)						
	Section	Information			Number of maximum Instance	
	Instance Type	Explicit Message				
	Production Trigger	Change of State/Application Trigger				
	Transport Type	Server				
	Transport Class	3				
	Attribute	ID	Description	GET	SET	Value
		1	State	✓		DeviceNet specification
		2	Instance type	✓		00 Hex (Explicit Message)
		3	Transport class trigger	✓		23 Hex (Client)
						83 Hex (server)

4	Produceed connection ID	✓		DeviceNet specification
5	Consumed connection ID	✓		DeviceNet specification
6	Initial comm. Characteristics	✓		21 Hex
7	Produceed connection size	✓		FFFF Hex
8	Consumed connection size	✓		FFFF Hex
9	Expected packet rate	✓	✓	2500 ms
12	Watchdog time-out Action	✓	✓	1 (Auto delete)
13	Produceed connection path length	✓		0
14	Produceed connection path	✓		NULL
15	Consumed connection path length	✓		0
16	Consumed connection path	✓		NULL
17	Produce_Inhibit_Time	✓		0

Service	DeviceNet service		Parameter option
	05	Reset	
	0E	Get_Attribute_Single	
	10	Set_Attribute_Single	

Instance (02 Hex: I/O POLL)

Section	Information		Number of maximum Instance		
Instance Type	Polled I/O		1		
Production Trigger	Cyclic				
Transport Type	Server				
Transport Class	2				
Attribute	ID	Description	GET	SET	Value
	1	State	✓		DeviceNet specification
	2	Instance type	✓		01 Hex (I/O Message)
	3	Transport class trigger	✓		82 Hex (server, class 2)
	4	Produceed connection ID	✓		DeviceNet specification
	5	Consumed connection ID	✓		DeviceNet specification

		6	Initial comm. Characteris-tics	✓		01 Hex
		7	Produceed connection size	✓	✓	BFM setting
		8	Consumed connection size	✓	✓	BFM setting
		9	Expected packet rate	✓	✓	0 ms
		12	Watchdog time-out Action	✓	✓	0 (time-out)
		13	Produceed connection path length	✓		6
		14	Produceed connection path	✓		20 04 24 65 30 03 Hex
		15	Consumed connection path length	✓		6
		16	Consumed connection path	✓	✓	20 04 24 65 30 03 Hex
		17	Produce_Inhibit_Time	✓		0
	Service	DeviceNet service		Parameter option		
		0E	Reset			
		10	Get_Attribute_Single			
			Set_Attribute_Single			

Instance (04 Hex: I/O COS)

Section	Information		Number of maximum Instance		
Instance Type	Polled I/O		2		
Production Trigger	COS				
Transport Type	Server				
Transport Class	2				
Attribute	ID	Description	GET	SET	Value
	1	State	✓		DeviceNet specification
	2	Instance type	✓		01 Hex (I/O Message)
	3	Transport class trigger	✓		
	4	Produceed connection ID	✓		DeviceNet specification
	5	Consumed connection ID	✓		DeviceNet specification
	6	Initial comm. Characteristics	✓		01 Hex
	7	Produceed connection size	✓		BFM setting
	8	Consumed connection size	✓		0
	9	Expected packet rate	✓	✓	0 ms

		12	Watchdog time-out Action	✓		0 (time-out
		13	Produceed connection path length	✓		6
		14	Produceed connection path	✓	✓	20 04 24 65 30 03 Hex
		15	Consumed connection path length	✓		No ACK: 0
						ACK: 4
		16	Consumed connection path	✓	✓	No ACK: NULL
						ACK: 20 2B 24 01
		17	Produce_Inhibit_Time	✓		0
	Service	DeviceNet service		Parameter option		
		0E	Reset			
		10	Get_Attribute_Single			
			Set_Attribute_Single			

Vendor-specific additional specifications	

B-6: Acknowledge Handler Object (2B Hex)

Class		
	Attribute	Not support
	Service	Not support

Instance (01 Hex)						
	Attribute	ID	Description	GET	SET	Value
		1	Acknowledge Timer	✓	✓	16
		2	Retry Limit	✓	✓	1
		3	COS Producing Connection Instanse	✓		Connection Instance ID
	Service	DeviceNet service		Parameter option		
		0E	Get_Attribute_Single			
		10	Get_Attribute_Signal			

Vendor-specific additional specifications	

Appendix C: List of Further Information Manual

For further information manual about FX Series, refer to following table. For DeviceNet master unit and other slave units, refer to each unit manual.

Table C-1: List of Further Information Manual

Manual Name	Manual No.	Description
FX_{2N} Hardware Manual	JY992D66301	This manual contains hardware explanations of wiring, installation and specifications for FX_{2N} Series programmable controllers.
FX_0/FX_{0N} Hardware Manual	JY992D47501	This manual contains hardware explanations of wiring, installation and specifications for FX_0 and FX_{0N} Series programmable controllers.
FX Programming Manual	JY992D48301	This manual contains instruction explanations for the FX_0, FX_{0S}, FX_{0N}, FX, FX_{2C}, FX_{2N} and FX_{2NC} Series programmable controllers.
FX Programming Manual Ⅱ	JY992D88101	This manual contains instruction explanations for the FX_{1S}, FX_{1N}, FX_{2N} and FX_{2NC} Series programmable controllers.

MEMO

USER'S MANUAL

FX2N-64DNET DeviceNet Interface Block

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE: MITSUBISHI DENKI BLDG MARUNOUCHI TOKYO 100-8310 TELEX: J24532 CABLE MELCO TOKYO
HIMEJI WORKS: 840, CHIYODA CHO, HIMEJI, JAPAN

JY992D86301A
(MEE0004)

Effective Apr. 2000
Specification are subuject
tochange without notice.